PSYCHOLOGICAL AND PSYCHOPHYSIOLOGICAL CORRELATES OF BINGE EATING

by

Shona L Fullarton, B.Sc. (Hons)

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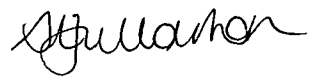
I certify that this thesis contains no material which has been accepted for a degree or diploma by the University or any other institution, except by way of background information where acknowledgment is made in the text of the thesis, and that to the best of my knowledge and belief this thesis contains no material previously published or written by another person except where due acknowledgment is made in the text of this thesis.



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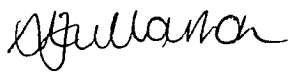

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ABSTRACT

Binge Eating Disorder (BED) has been included in the *Diagnostic and Statistical Manual of Mental Disorders, Fourth Edition* (DSM-IV; American Psychiatric Association [APA], 1994), as a new diagnostic condition that requires further investigation. The main feature of BED is uncontrolled binge eating, which overlaps with the DSM-IV (APA, 1994) diagnostic criteria of Bulimia Nervosa (BN). In contrast to BN, BED commonly occurs in overweight people. It has been speculated that individuals with BED represents a subset of the obese population. Therefore, there is debate as to whether BED is a distinct diagnostic entity, is a less severe form of BN, or is a manifestation of disturbed eating that does not warrant psychiatric status. The aim of this research was to clarify whether BED characterises disturbed or disordered eating.

A range of factors have been identified that may contribute to the development of disturbed or disordered eating. There is evidence to suggest that there is some overlap in the factors associated with the development of BN, BED and obesity. However, the behaviour of each of these groups indicates that the processes involved may be different. The continuity model of eating proposes that eating behaviour is distributed along a continuum, with normal eating occurring at one end, disordered eating at the other, with disturbed eating occurring at a point in between these. In terms of the continuity model, two propositions are raised with regard to BED. Proposition 1 speculates that the behaviour of individuals with BED represents disordered eating and, therefore, is more similar to BN. Proposition 2 states that BED represents disturbed eating and, therefore, individuals with BED are more similar to overweight individuals in terms of behaviour.

Four groups were involved in this study. The first group all engaged in binge eating and compensatory purging behaviours. Most of this group currently had a diagnosis of BN although a small number currently did not meet the frequency of binge eating criterion and would be diagnosed with an Eating Disorder, Not Otherwise Specified (EDNOS). The second group met the diagnostic criteria for BED. The third group did not engage in binge eating or purging behaviours but were overweight (OW) with a Body Mass Index greater than 25. Finally, a normal weight group (NW) who did not display disturbed or disordered eating was included for control purposes.

In Study 1, self-report and semi-structured interviews were administered to determine demographic characteristics, along with measures of eating and general symptomatology. BN and BED groups differed in demographic characteristics, whereas the BED and OW groups were more similar. In terms of symptomatology, the BN group reported the highest levels, with the BED group being more similar to the BN than OW group.

In Study 2, 3, and 4, a five stage, personalised guided imagery methodology was utilised. Study 2 examined objective and subjective psychophysiological responses to binge eating or overeating, with comparisons being made to normal eating and non-eating neutral events. There was little evidence of variation between groups on objective measures of arousal across the binge episode. In contrast, for subjective measures, whereas the overall pattern of response was similar for all groups, the intensity of the response was greater for the BN and BED groups. For example, the BN and BED groups reported higher levels of tension and physical discomfort than the OW and NW groups.

Study 3 examined the emotional responses to the process of binge eating by comparing them with responses to control events. Again, the pattern of response was similar for all groups, although the intensity of the negative response was greater for the BN and BED groups, especially in response to the binge eating script. In addition, emotional responses to different eating situations and triggers were considered. Overall, although there was considerable similarity between the BN and BED groups, these groups could be distinguished by particular patterns. There was little variation between the OW and NW groups.

Finally, in Study 4, the cognitions associated with the process of bingeing were investigated, with comparisons being made to the cognitions associated with control events. Distinctive patterns of thoughts associated with different stages of binge eating were noted for the groups. An example of this was for the statement, "I have already eaten too much so I may as well eat more". Interestingly, some cognitions related to weight gain were rated highly by all groups, even in response to control events. In addition, evidence for general cognitive distortion was examined. It was apparent that only the BN group had clinically elevated scores on general measures.

The results indicated that despite some similarities with overweight individuals, there is more evidence that BED is an eating disorder rather than an eating disturbance. Further, there is sufficient evidence that BN and BED represent distinct diagnostic entities despite some fundamental similarities between the conditions. From the point of view of the continuum, with BED falling between BN and OW, support for the continuity hypothesis can be found

from the results. The implications of the results are discussed in relation to the diagnostic status of BED and the identification of management of the condition.

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CHAPTER 1

INTRODUCTION AND OVERVIEW

1.1 INTRODUCTION

There is recognition that eating behaviours may fall on a continuum from normal through to disordered eating, with disturbed eating falling between the two extremes (Hsu, 1990; Prather & Williamson, 1988; Stice, Killen, Hayward, & Taylor, 1998a). Disordered eating is defined as eating behaviours associated with eating psychopathology such as Anorexia Nervosa (AN) and Bulimia Nervosa (BN). In these conditions, not only is the eating behaviour disturbed, it is generally recognised that other forms of psychological dysfunction are present (Brewerton et al., 1995; Carroll, Touyz, & Beumont, 1996; Crow, Zander, Crosby, & Mitchell, 1996; deZwaan & Mitchell, 1992; Garfinkel, Lin et al., 1995; Hay & Fairburn, 1998; Marcus et al., 1990; Mussell et al., 1995; Zaider, Johnson, & Cocknell, 2002). In contrast, disturbed eating is defined as unhealthy eating patterns, such as those associated with restrained eating or obesity, but without the concurrent psychological features (Zimmerman & Coryell, 1989).

There has been a proposal included in the Diagnostic and Statistical Manual of Mental Disorders (DSM-IV; American Psychiatric Association [APA], 1994), that an additional eating disorder type be recognised as a distinct psychiatric condition, separate from other eating disorders. This condition has been termed Binge Eating Disorder (BED) because the primary characteristic is uncontrolled binge eating in the absence of compensatory behaviours. In comparison to AN and BN, much less is known about this proposed disorder. It is uncertain whether BED is a form of disordered eating or whether it would be better characterised as disturbed eating.

It has been reported that eating disorders represent a significant clinical problem, particularly in Western societies. The prevalence of AN is 0.5 to 1.0

percent of females, although many more have a subclinical presentation (APA, 1994). For BN, the prevalence rate is 1 to 3 percent of young females (APA, 1994). Although cultural differences in prevalence rates have been noted, some countries such as Japan have reported similar rates to Western cultures (Nakamura et al., 2000). The cost of these disorders for the individual and society is high.

There are recognised management difficulties in treating eating disorders. There is a multitude of treatment options available for the management of disordered eating, for example, cognitive behavioural therapy (Fairburn, Cooper, & Shafran, 2003), interpersonal therapy (Wilson & Pike, 1993), and dialectical behaviour therapy (Safer, Lively, Telch, & Agras, 2002), and intervention can either be targeted toward the individual, group or family. Further, inpatient, day patient and outpatient treatment has been utilised (e.g., Anzai, Lindsey-Dudley, & Bidwell, 2002). Successes with these treatments have been reported (e.g., Haas & Clopton, 2003). However, in addition to problems with eating behaviours, these disorders are characterised by more pervasive psychological difficulties that makes treatment challenging.

1.2 DEFINITION OF THE PROBLEM

The suggestion has been made that BED be considered a separate psychiatric condition. Binge eating in obese individuals was recognised more than 40 years ago (Stunkard, 1959). Since this finding, research has indicated that the behaviour is specific to a subset of individuals. In more recent times, it has been postulated that the behaviour represents a form of disordered eating

(e.g., Brody, Walsh, & Devlin, 1994; Crow, Agras, Halmi, Mitchell, & Kraemer, 2002; Rissanen, 1993).

The aim of this study is to address whether BED is best understood as an eating disturbance or an eating disorder. If eating behaviours are considered to fall on a continuum from normal through to disordered, BED could either fall on the disturbed end or disordered end of the continuum. It is recognised that individuals with disturbed eating differ from individuals with normal eating patterns in relation to their eating behaviour, but do not differ in terms of psychological symptomatology (Marcus et al., 1990; Molinari, Ragazzoni, & Morosin, 1997; Yanovski, Nelson, Dubbert, & Spitzer, 1993). Treatment that targets eating behaviour alone has been found to be effective for people with disturbed eating patterns (e.g., Melin & Roessner, 2003). Therefore, there are few reported differences between individuals with normal eating patterns and obese individuals apart from their eating behaviours.

There are shared characteristics between obese individuals and those with BED. In particular, individuals with BED have been reported to represent a subset of obese individuals. For example, the prevalence of BED has been reported to be far greater in obese populations in comparison to the general population (e.g., Pacheco, 1999; Ramacciotti et al., 2000; Ricca et al., 2000). Therefore, it could be postulated that BED is merely a more severe form of disturbed eating than obesity.

There has been an alternative proposition for the understanding of the nature of BED. The inclusion of BED in the DSM-IV (APA, 1994) has indicated growing evidence that the seriousness of the eating patterns in BED are of the

same magnitude as other eating disorders, such as BN. Indeed, BN and BED share a common characteristic in the form of binge eating.

For BED to be considered a disorder, there has to be an associated level of symptomatology, similar, but not necessarily identical to that of BN, that relates to the eating behaviour. However, from the definition in the DSM-IV (APA, 1994), the main difference between BN and BED is that individuals with BN engage in inappropriate compensatory behaviours whereas the BED group do not. For BED to be a distinct diagnostic entity there has to be idiosyncratic features that distinguish it from BN.

The different focus of the research has lead to the development of a variety of conceptualisations of an eating disorder continuum. Eating continuums have traditionally not included AN. The behaviours associated with AN do not include binge eating (APA, 1994) and it has been described as being qualitatively different from BN (e.g., Garner, Olmsted, & Garfinkel, 1983; Garner, Olmsted, Polivy, & Garfinkel, 1984). However, it may be that a continuum exists from normal eating to AN, that may be related to the normal eating to the BN continuum (Scarano & Kalodner-Martin, 1994). Individuals with AN are not included in this study.

Figure 1 presents the continuum outlined by Scarano and Kalodner-Martin (1994). In this case, the component behaviours of BN are added along the continuum resulting in BN.

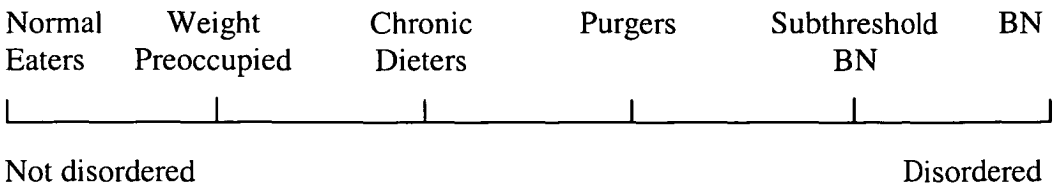

Figure 1. An eating continuum, ranging from normal eating through to BN, outlined by Scarano and Kalodner-Martin (1994).

Other continuums have included BED due to the fact that individuals with this disorder also engage in binge eating. Therefore, it would be expected that BED would fall on the same continuum as BN. The complexity of these continuums have varied. For example, Figure 2 presents a simplified representation of eating disorder developed by Fichter, Quadflieg, and Brandl (1993). In contrast, Figure 3 presents the conceptualisation by Fitzgibbon, Sanchez-Johnsen, and Matinovich (2003) that takes into account sub-clinical versions of disordered eating.

Figure 2. An eating continuum incorporating BED, proposed by Fichter et al. (1993).

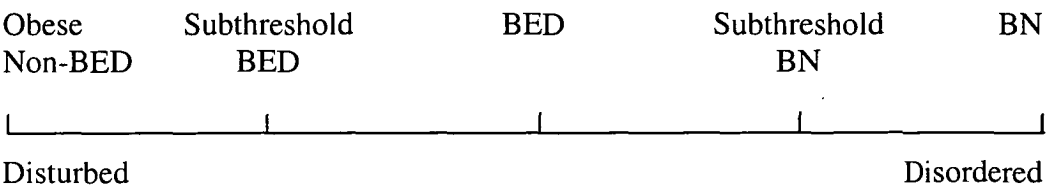

Figure 3. An eating continuum developed by Fitzgibbon et al. (2003).

The conceptualisation of a continuum of eating disturbance and disorder that would be appropriate for the current investigation would need to include non-disturbed eating, disturbed eating and disordered eating patterns. Given that BED has been proposed as a possible eating disorder, it would be important to qualify whether it is a manifestation of eating disturbance (e.g., a subset of obesity) or a distinct diagnostic entity allied to BN. Figure 4 diagrammatically presents the location of BED on the eating continuum indicated by the opposing propositions.

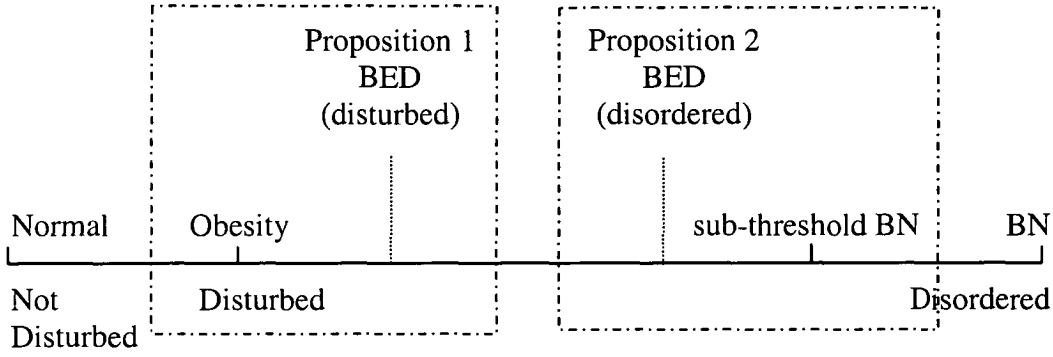

Figure 4. The location of BED on the eating continuum indicated by the opposing propositions.

1.3 OVERVIEW

To begin, Chapter 2 provides a definition of each of the eating conditions. Consideration is given to points of overlap as well as the distinctive features for the conditions of interest. Further, it is necessary to establish whether there were fundamental differences reported in the literature between BN, BED and obese individuals in relation to prevalence, sex distribution, age of onset, course, and comorbidity.

Chapter 3 considers a range of factors relevant to the aetiology of BN, BED and obesity to determine whether different factors were related to the onset and maintenance of each condition. Factors such as restraint, negative mood, and individual and environmental aspects are examined in the development of BN. For BED, theories and factors have usually been extensions of those for BN. In addition, information regarding the course indicates some differences between BED and BN. The literature on theories of obesity includes the set-point theory, genetic, and environmental theories. Additionally, the continuity theory of eating disorders is examined, which considers a range of eating behaviours, from normal eating through to disturbed and disordered eating.

Chapter 4 examines both eating symptomatology and general symptomatology to establish whether differences exist between BN, BED and obesity. As indicated, psychological disturbance in addition to eating problems would need to be established for BED to be considered a similar disorder to BN. Chapter 4 also investigates binge related behaviour to determine if differences exist between BN and BED given that the behaviour is defined in the DSM-IV (APA, 1994) in predominantly the same way. The quantity and quality of the food consumed during a binge is considered, along with non-binge eating behaviour.

Chapter 5 reviews the literature pertaining to psychophysiological responses to binge eating. Subjective psychophysiological responses such as tension and hunger are examined in relation to BN and BED. In addition, objective psychophysiological responses are investigated with regard to arousal to food exposure, in response to test meals and as a reaction to stress.

Chapter 6 investigates the literature in relation to emotional reactions to binge eating in BN and BED. Motivations for binge eating are considered. Further, the process of binge eating is investigated by examining changes in emotional response across a binge eating episode, with consideration being given to the antecedents of binge eating, emotional responses during the binge and emotional reactions as a consequence of the binge.

Chapter 7 reviews the literature on the cognitions associated with binge eating. The relevant research in a number of areas is considered, such as cognitive distortions that were unrelated to food and eating, and food and body related cognitive distortions. The content of dysfunctional beliefs and the consequences of dysfunctional beliefs are addressed. The relationship between dysfunctional beliefs and depression is examined in light of the association between eating disorders and depressive symptomatology. Changes in cognitions across a binge episode are reported by examining cognitions prior to a binge, during a binge and after a binge. Finally, cognitions associated with binge eating are compared with cognitions in response to a normal meal. Methodological issues are raised.

The empirical chapters make comparisons between four groups, examining symptomatology, psychophysiology, emotional reactions and cognitive responses. These groups are a binge eating group with compensatory behaviour (in the form of purging), binge eating without compensatory behaviour, an overweight group with no binge eating behaviour, and a normal weight group without binge eating behaviour.

Chapter 8 reports the results of a between group comparison of eating and general symptomatology among the four groups. Widely used measures of

eating symptomatology and depressive symptomatology are employed. In addition, this chapter presents descriptive information about the groups in terms of demographic variables and binge eating behaviour.

Chapter 9 considers the process of binge eating and examines psychophysiological responses to binge eating behaviour, normal eating behaviour and non-eating, emotionally neutral events. Changes in response over the course of a binge episode are examined. Both objective measures of psychophysiological arousal and subjective measures of psychophysiological response are investigated. A personalised, staged guided imagery methodology is used to elicit psychophysiological responses to specific events of interest.

Chapter 10 examines the emotional responses to binge eating by applying the guided imagery methodology to the process of binge eating or overeating in the four groups, as well as responses to control eating and non-eating events. In addition, emotional responses to eating in a range of situations are investigated to determine between group and between event type differences.

Chapter 11 addresses changes in cognitions relating to food and body in response to guided imagery of a binge event or overeating and eating and non-eating control events for the four groups. Further, general cognitive distortions in relation to the structure and content of thoughts are examined.

Finally, Chapter 12 provides a summary and integration of results. Methodological issues are highlighted and directions for future research are proposed.

CHAPTER 2

DEFINITIONS AND DIAGNOSES

2.1 INTRODUCTION

To establish differences between various eating behaviours it is essential to consider factors that distinguish these behaviours, such as definition, prevalence, course and demographic variables relevant to subjects. For example, BED has been associated with BN in the literature due to the binge eating behaviour of the two disorders being defined identically in the DSM-IV (1994), with other features of the two disorders being used to distinguish them. Although the definition of a binge is the same, the phenomenological experience may be different (Mitchell, Crow, Peterson, Wonderlich, & Crosby, 1998).

BED has also been linked with obesity, as BED is most commonly diagnosed in individuals who are obese (e.g., Ricca et al., 2000). There have been a number of theories about BED that researchers have argued; firstly, that BED is a continuum of the eating disorders spectrum of BN (e.g., Fairburn, Welch, & Hay, 1993; Raymond, Mussell, Mitchell, deZwaan, & Crosby, 1995), secondly, that it is a behavioural condition experienced by a subset of obese individuals (e.g., deZwann, Nutzinger, & Schoenbeck, 1992), and finally, that it is a unique disorder with categorical differences between BED and BN and obesity (e.g., Geliebter, Hassid, & Hashim, 2001).

Research into BED and BN has found that there are differences between them. Further, differences have also been found between BED and obesity and in the demographics, onset, aetiology and the co-morbidity with other disorders.

2.2 DEFINITION

BN commonly occurs in normal weight individuals. Two essential features of the disorder are binge eating and inappropriate compensatory

behaviours. Binge eating must be recurrent, and is defined in the DSM-IV (APA, 1994) as both "eating, in a discrete period of time (e.g., within any 2-hour period), an amount of food that is definitely larger than most people would eat during a similar period of time and under similar circumstances", and "a sense of lack of control over eating during the episode (e.g., a feeling that one cannot stop eating or control what or how much one is eating)" (APA, 1994, p. 549).

The recurrent inappropriate compensatory behaviour is utilised to prevent weight gain. Therefore, individuals may engage in behaviours such as self-induced vomiting, the misuse of laxatives, diuretics, enemas, excessive restriction of food intake or excessive exercise. To meet the DSM-IV diagnostic criteria, the binge eating and inappropriate compensatory behaviours must both occur at least twice a week for three months. In addition to these behaviours, body shape and weight must excessively influence self-evaluation. A diagnosis of BN is not given if the disturbance occurs exclusively during episodes of AN.

BN is also divided into two different types, defined by the types of inappropriate behaviours in which the individual engages. Purging Type refers to individuals engaging "in self-induced vomiting or the misuse of laxatives, diuretics, or enemas" (APA, 1994, p.550). Nonpurging Type describes other forms of inappropriate compensatory behaviours, such as excessive dieting or exercise, where the individual does not regularly engage in purging behaviours (APA, 1994).

BED is usually, but not always, diagnosed in overweight individuals. It has been included in the appendix of the fourth edition of the DSM (APA, 1994) as a new diagnostic category requiring further investigation. For a diagnosis of BED, the essential requirements are recurrent episodes of binge eating, and

marked distress regarding the binge eating. The binge eating definition in the DSM-IV applied to BED is identical to the one provided for BN. In addition, the individual with BED needs to experience a minimum of three of the following: "eating much more rapidly than normal; eating until feeling uncomfortably full; eating large amounts of food when not feeling physically hungry; eating alone because of being embarrassed by how much one is eating; and feeling disgusted with oneself, depressed, or guilty after overeating" (APA, 1994, p.731). Binge eating occurs, on average, at least two days per week for a period of six months. Individuals with BED do not engage in inappropriate compensatory behaviours.

Obesity is the condition of being significantly overweight, which is usually defined in reference to a 'standard' or ideal body weight for age and sex (Romano & Quinn, 1995). Overweight and obese are usually defined in terms of an individual's Body Mass Index (BMI). The BMI is calculated as weight (kg) divided by height (m) squared (kg/m^2). Overweight individuals are considered to have a BMI between 25 and 29.9, and obese individuals a BMI over 30 (Keys, Fidanza, Karvonen, Komura, & Taylor, 1972). Obese individuals may engage in more generalised overeating patterns, but may not necessarily engage in binge eating (Pincus & First, 1999).

In summary, although the definition of binge eating behaviour is identical for BN and BED, there are a number of individual factors that relate to each disorder. These factors refer to the behavioural and psychological responses that individuals must display to meet diagnostic criteria. In comparison, the definition for obesity is related only to individual size, with no behavioural or psychological factors included.

2.3 PREVALENCE

The lifetime prevalence of BN among women is approximately 1 to 3 percent (APA, 1994). A number of studies report the prevalence of BN to be within this range (Kinzl, Traweger, Trefalt, Mangweth, & Biebl, 1999; Morande, Celada, & Casas, 1999). BN has been found to have roughly equivalent rates in most industrialised countries, including Australia (0.3%, Hay, 1998), the United States (1%, Drenowski, Hopkins, & Kessler, 1988; Schotte & Stunkard, 1987), Canada (1.1%, Garfinkel, Lin et al., 1995), Japan (1.02%, Nakamura et al., 2000), New Zealand (1.6%, Bushnell, Wells, Hornblow, Oakley-Browne, & Joyce, 1990), and Germany (1.1% in 1997; Westenhoefer, 2001). In a population of 15 year olds, the prevalence was found to be 0.7 percent, with an additional 0.7 percent with sub-clinical bulimic symptoms (Rosenvinge, Borgen, & Boerresen, 1999). However, in the higher risk group of young females, prevalence has been reported to be as high as 19 percent (Halmi, Falk, & Schwartz, 1981).

Although a decrease in prevalence of BN was reported from 1982 (7.2%) to 1992 (5%) (Heatherton, Nichols, Mahamedi, & Keel, 1995), other studies have reported an increase in prevalence (Kendler et al., 1991). Following a review of studies on prevalence, Fombonne (1996) concluded that, on balance, the incidence of BN has remained stable since the 1980s.

The prevalence of BED in a nonpatient community sample was reported to be approximately 0.7 to 4.0 percent (APA, 1994). This is supported by studies that have reported the prevalence of BED to be 0.7 percent in a West German population (Westenhoefer, 2001), 1 percent in a community sample in Australia (Hay, 1998) and 3.3 percent in a general Austrian population (Kinzl et al., 1999).

A higher prevalence in obese populations has been reported. The prevalence of BED in a sample of obese patients was found to be 7.5 percent, with the patients with BED having a higher BMI compared with obese patients without BED (Ricca et al., 2000). Consistent with this finding, 7.8 percent of women in a weight-loss treatment were found to have BED (Pacheco, 1999). Even higher prevalences of BED have been found in obese populations: 12.1 percent (Ramacciotti et al., 2000), 19 percent (Brody et al., 1994), and 34.4 percent (deZwann et al., 1992). However, particularly in the study by deZwann et al. (1992), the definition for binge eating was broad, including patients with only moderate problems with regard to binge eating frequency. The incidence of BED increases when examining individuals attending programs such as Overeaters Anonymous. As high as 70 percent of individuals in this program were found to suffer from BED (Spitzer et al., 1992). In 15 year olds, the prevalence was reported to be 1.0 percent with BED (Rosenvinge et al., 1999).

The prevalence of obesity has been dramatically increasing over the last 15 years (Finkelstein, 2000; Jeffery, 2001; Mokdad et al., 2000). Between 1980 and 1994 there was a 32 percent increase in the rate of obesity in America. In 1994, 33 percent of adults were identified as having a BMI in the overweight range (Townsend, 2001). The 1995 National Health Survey by the Australian Bureau of Statistics (ABS) found that of Australians aged 18 years or over, 57 percent were overweight or obese. Males were more likely than females to be overweight or obese at every age, with 28 percent of females being identified as obese based on their BMI (ABS, 1998).

In summary, the prevalence for BN and BED is similar in the general population (1-3% and 0.7-4%, respectively). However, for BN a higher

prevalence has been reported in young females (as high as 19%) and for BED a higher prevalence has been reported in obese individuals (as high as 70%). The prevalence for obesity in females has been reported at 28 percent of the Australian population. Therefore, it appears that obesity occurs more commonly in the general population than BN and BED. For BN and BED, it appears that they affect certain groups of individuals resulting in higher rates in specific populations.

2.4 SEX DISTRIBUTION

The prevalence rates of eating disorders in males and females have been established to be different and there is some evidence that the characteristics of the eating styles can be distinguished between the sexes. The rate of occurrence of BN in males is approximately one-tenth of that in females in clinical and population samples (Ampollini et al., 1999; Carlat & Camargo, 1991). This is supported by a Canadian study that found the prevalence of BN in males to be 0.1 percent (Garfinkel, Lin et al., 1995).

According to the DSM-IV, females are approximately 1.5 times more likely to have BED than males (APA, 1994). Studies have reported that BED is more common in overweight women than overweight men (deZwaan et al., 1992; Rissanen, 1993; Spitzer et al., 1992; Yanovski et al., 1993).

In a study examining the epidemiology of obesity in adults aged 18 to 96 years, 25 percent of females and 18 percent of males were found to be overweight (Rand & Kaldau, 1990). This indicates that there is a high prevalence of obesity in both males and females.

Men with eating disorders have been determined to be similar to females with eating disorders (Lundholm & Anderson, 1986) in terms of course and outcome (Eliot & Baker, 2001), with disordered eating in males closely resembling that of females (Olivardia, Pope, Mangweth, & Hudson, 1995). However, some differences have been reported between males and females. In a number of studies, homosexuality or bisexuality appeared to be a specific risk factor for developing BN for males (Carlat & Camargo, 1991; Carlat, Camargo, & Herzog, 1997; Lundholm & Anderson, 1986). In contrast to this finding, Olivardia and colleagues (1995) did not find homosexuality to be a feature of eating disorders in males. However, this study had a small sample size, which makes the generalisability of their results difficult.

Additional significant differences between males and females with BN have been reported in the literature, including males having higher pre-illness weight, different mode of onset and distinct psychotherapeutic needs (Lundholm & Anderson, 1986). The therapeutic issues highlighted for males from this study included sexuality, exercise, and issues relating to family and temperament. In support of this finding, Carlat and Camargo (1991) also found a higher prevalence of premorbid obesity in males. Additionally, males had a later age of onset, and less concern with strict weight control.

In a comparison of males and females with BED, no differences were found in age that they were first overweight, age at first diet, age of first regular binge eating or number of weight cycles (Barry, Grilo, & Masheb, 2002). However, some differences were found, with men presenting for treatment for BED being significantly more overweight than women, and reporting a lower level of body dissatisfaction and drive for thinness, as determined by the Eating

Disorder Inventory (EDI; Garner, Olmstead, & Polivy, 1983a: EDI-II; Garner, 1990).

In summary, BN, BED and obesity are all more common in females than males. However, the overall incidence of obesity is far greater than BN and BED. Further, for obese individuals, the difference between the prevalence for males and females is less. Although these conditions occur in both males and females, some differences between these two groups have been reported in the literature, indicating that it would be important to study males and females separately.

2.5 AGE OF ONSET

Evidence indicates that differences exist in the age of onset of BN, BED and obesity. BN has been found to occur in late adolescence or early adult life. Binge eating frequently begins during or after an episode of dieting. Typically, the age of onset is in late adolescence or in the early 20's. Binge eating usually occurs soon after significant weight loss from dieting (APA, 1994).

The age of onset for BN was found to be 19.3 years in one study (Bulik, Sullivan, Carter, & Joyce, 1997). In another study, dieting was found to occur at 16.2 years, and the onset of binge eating was 19.8 years (Raymond et al., 1995) suggesting a lag between the onset of the two eating related behaviours. As will be discussed, the pattern of onset of diet and binge may vary. When comparing dieting or binge eating preceding the onset of BN, the age of onset for BN was found to be 17.6 years for the diet first groups and 17.7 years for the binge first group (Haiman & Devlin, 1999). This indicates that ultimately, the sequence of dieting or bingeing makes little difference in relation to the age of onset of BN.

In a study examining individuals with BED, the mean age of onset of dieting was found to be 17 years, with binge eating occurring at 18 years, with full diagnostic criteria for BED being met at 25 years (Spurrell, Wilfley, Tanofsky, & Brownwell, 1997). Another study reported earlier ages of onset, with dieting occurring at 15 years and binge eating at 14.3 years (Raymond et al., 1995). These data came from a treatment study for binge eating requiring participants to pay $1000. Therefore, this sample may not have been representative of the general BED population. Other studies have found onset of BED to occur around 19 to 25 years (Mussell et al., 1995; Schwalberg, Barlow, Alger, & Howard, 1992; Telch & Agras, 1994), which supports the results of the Spurrell et al. (1997) study.

Interestingly, when individuals with BED were divided into those who dieted first and those who binge ate first, age of onset of binge eating and for meeting the diagnostic criteria for BED was found to differ significantly. Mean age of onset of the first binge was 12 years for the binge first group, compared to 25 years for the diet first group. The mean age at which the participants met the diagnostic criteria for BED was 19 years versus 33 years for the binge first and diet first groups, respectively. There were no differences between the two groups for age of onset of dieting or onset of weight gain (Spurrell et al., 1997).

There has been more variability reported with regard to the age of onset of obesity, ranging from childhood through to adulthood (O'Neil et al., 1981). There is a pattern of early onset, which occurs in childhood and adolescence, and late onset obesity, which occurs during adulthood (Wing, Nowalk, Epstein, Scott, & Ewing, 1985). Onset of obesity in individuals with BED has been found to occur at approximately 16 years of age. This was significantly younger than

obese individuals without BED, whose age of onset was between 20 and 25 years (Brody et al., 1994; Marcus, Smith, Santelli, & Kaye, 1992; Spitzer et al., 1993).

In summary, the age of onset of binge eating behaviour appears not to vary between BN and BED groups. However, the typical age of onset for BN is late adolescence or early adult life, compared with the age of 25 years for BED, suggesting a longer prodromal period in BED. The onset for obesity appears to be more variable than that for either BN or BED.

2.6 COURSE

In addition to comparing the groups on the age of onset, it is important to consider the course of each disorder to highlight similarities and differences between them. For BN, it has been found that the onset of symptoms of BN typically precedes treatment by three to five years. This is usually due to the shame and humiliation that the sufferer experiences (Herzog, Keller, Lavori, & Sacks, 1991). Their disordered eating behaviour has been found to persist for at least several years in a large percentage of clinical samples (APA, 1994).

The course may be chronic or intermittent. Over the long-term, symptoms have been found to diminish. Periods of remission longer than 1 year are associated with better long-term prognosis (APA, 1994; Herzog et al., 1991). Further, "recovered" BN sufferers often continue to experience residual symptoms, implying the persistence of a subclinical form of the disorder (Herzog et al., 1991).

The majority of the literature considering the development of BN has found that weight concerns and dietary restriction precede binge eating and compensatory behaviours (e.g., Lacey, Coker, & Birtchnell, 1986). However,

there is increasing support that in a subgroup of people with BN, binge eating precedes dietary behaviour (Haiman & Devlin, 1999; Mussell et al., 1997). It has been found that in the majority of women with BN, dieting predates binge eating (81%), and in a minority of women (17%) binge eating is developed prior to any attempts to lose weight by dieting. However, over 96 percent of women reported dieting prior to meeting the diagnostic criteria for BN. Therefore, dieting appears to be a common precipitant of the development of BN (Bulik et al., 1997). The frequency of bingeing and purging did not differ between the women who either dieted or binge ate first (Bulik et al., 1997; Haiman & Devlin, 1999). Additionally, both groups have been found to have comparable fears of becoming 'fat' and degree of body dissatisfaction (Mussell et al., 1997). Individuals who binge ate before the onset of dieting were consistently found to have higher weight status than those who dieted first, suggesting a resemblance to BED (Haiman & Devlin, 1999).

Inconsistent results have been reported regarding the age at which the diet first group and binge eat first group met the diagnostic criteria for BN. Some studies have found no differences between the two groups (Bulik et al., 1997; Haiman & Devlin, 1999), whereas another study found that those who binge ate first had an earlier onset of eating disorder symptoms and had a longer progression to the development of the full syndrome (Haiman & Devlin, 1999). It was theorised that although it takes longer for individuals who binge eat first to reach the diagnostic criteria for BN, they may meet the criteria for BED prior to the onset of regular inappropriate compensatory behaviours (Haiman & Devlin, 1999). The question is then raised as to why some individuals go on to adopt purging behaviours and others do not. Obese women with BED were found to

have higher levels of disinhibition and hunger than obese non-BED women, but both groups were found to have the same low levels of restraint (Yanovski et al., 1993). Therefore, it may be that the low level of restraint is related to the development of BED, whereas high levels of restraint may result in the development of BN (Haiman & Devlin, 1999). The link between BN and high restraint has been well established (Laessle, Platte, Schweiger, & Pirke, 1996; Lowe et al., 1996; Stice, 1998a; Stice, Shaw, & Nemeroff, 1998).

Factors that predict a poorer outcome in individuals with BN have been studied in the literature. A higher severity of eating disturbance (Herzog et al., 1991), increased depressive symtomatology (Swift, Kalin, Wamboldt, Kaslow, & Ritholz, 1985), a history of alcohol abuse (Lacey, 1983), and suicide attempts (Abraham, Mira, & Llewellyn-Jones, 1983) have all been linked with poorer outcome. Factors unrelated to outcome included age at presentation (Abraham et al., 1983) and the duration of the bulimic episode (Abraham et al., 1983; Mitchell, Davis, Goff, & Pyle, 1986).

In a study by Lacey et al. (1986) that examined factors associated with the aetiology of BN, fifty females with BN based on DSM-III diagnostic criteria were interviewed. Lacy et al. (1986) concluded that there were consistent themes in the factors reported to be associated with BN. There were doubts concerning femininity (78%), a poor relationship with parents (60%), academic striving (46%), parental marital conflict (44%), and poor peer group relationships (28%).

For individuals with BED seeking treatment, like BN, the course appears to be chronic (APA, 1994). The same two pathways of development in BN have been reported in BED. Those who diet first and those who binge eat first (Spurrell et al., 1997). The binge eat first pathway appears to be more common

in BED than BN (Mussell et al., 1995, 1997). In support of this finding, only 29 percent of individuals with BED reported that dieting preceded binge eating, compared with 89 percent of individuals with non-purging BN, indicating that other pathways are common in the development of BED (Santonastaso, Ferrara, & Favaro, 1999). Further, for individuals with BED, only 29 percent reported that a loss of weight of at least four kilograms occurred before the onset of binge eating, compared with 82 percent of individuals with non-purging BN. It was concluded in this study that the BED pathway to binge eating is more variable, and individuals with BED form a more heterogenous group (Santanastaso et al., 1999).

However, when examining the two pathways in BED, the two groups did not differ on current levels of eating disturbance, current weight, or psychological distress, indicating that whether a person diets or binges first is not associated with differences in presentation of the disorder (Spurrell et al., 1997). In a retrospective study of individuals with BED, it was found that the majority of participants denied significant weight problems when binge eating was first initiated. It was concluded that binge eating appears to develop in the absence of significant dieting or weight problems. However, obesity is likely to occur as BED develops and the binge eating behaviour continues (Mussell et al., 1995). In a study examining binge eating in a female population, it was found that women who went on one or more diets within the previous year, and/or had chronic restrained eating behaviour were significantly more likely to engage in binge eating episodes (Kinzl et al., 1999).

Obese individuals with BED have been reported to have an earlier onset of obesity than obese individuals without BED (Rissanen, 1993). BED

individuals tended to have had large weight fluctuations in the past and dieting had generally been started at an early age (deZwaan & Mitchell, 1992).

Obesity is a heterogenous syndrome that can be determined by many different combinations of pathological factors (Brownell & Wadden, 1992). Individuals with childhood obesity have been found to exhibit more dietary restraint than those who become obese as adults (O'Neil et al., 1981). Further, they have been found to have greater body image disturbances (Stunkard & Burt, 1967) and may have experienced more negative emotional reactions to dieting (Grinker, Hirsch, & Levin, 1973) than those with mature onset obesity. When comparing individuals attending a weight loss program, those with early onset obesity tended to be younger and heavier than those with mature onset obesity (Wing et al., 1985). These findings need to be interpreted with caution, due to binge eating in the obese not being controlled for in the earlier studies.

In summary, the course for BN appears to be intermittent or chronic. Weight and dietary restriction are the most common factors preceding binge eating and inappropriate compensatory behaviours, however, in a subset of individuals, binge eating precedes dietary behaviour. For BED, the course appears to be chronic. Binge eating behaviour prior to the onset of BED appears to be the usual course, although there are some individuals who diet prior the onset of BED. Obesity onset in BED appears to occur earlier than obesity in the non-BED population. With non-BED obese individuals, onset appears to be more heterogenous, occurring at a wide range of ages.

2.7 COMORBIDITY

In addition to examining differences in the course of these disorders, it is important to examine differences in levels of comorbidity. There have been a number of studies that have examined the extent of comorbidity in the eating disorders. For example, various studies have linked BN with depressive symtomatology (Brewerton et al., 1995; Crow et al., 1996; Garfinkel, Lin et al., 1995; Zaider et al., 2002).

In an examination of a non-clinical community sample, it was found that for individuals with BN there was a threefold increase in the lifetime occurrence of major depression and at least a doubling of the rate for anxiety disorders (Garfinkel, Lin et al., 1995). In addition to this, individuals with BN had significantly higher rates of social and specific phobias, agoraphobia, panic disorder, and generalised anxiety disorder than comparison participants.

Individuals with BN have also been found to have significantly higher lifetime rates for alcohol dependence, childhood sexual abuse, parental disharmony, and parental psychopathology than for the comparison group (Garfinkel, Lin et al., 1995). Comparisons have also been made between BN purge type and BN nonpurge type. The BN purge type was distinguished from the BN nonpurge type by extremely high rates of comorbidity for depression, anxiety disorders and alcohol abuse, as well as an earlier age of onset. However, the BN nonpurge group also displayed very high levels of comorbid psychopathologies (Garfinkel et al., 1996).

It has been postulated that BN is similar to obsessive compulsive disorder (OCD). Studies have reported evidence of a relationship between BN and OCD (e.g., Bulik, Beidel, Duchmann, Weltzin, & Kaye, 1992), and found that BN is

more strongly related to obsessions than to compulsions (Formea & Burns, 1995), and that eating disordered individuals have an increase in OCD symptoms (Hsu, Kaye, & Weltzin, 1993). However, BN has not been found to be a variant of OCD (Hsu et al., 1993).

The comorbidity between BN and DSM-IV (APA, 1994) Axis II disorders has been examined (Carroll et al., 1996), controlling for the presence of comorbid depression. It was found that for the depressed BN group, 46.7 percent met the diagnostic criteria for at least one Axis II disorder, compared with 33.3 percent of the non-depressed BN group. For the non-eating disordered control group, only 6.7 percent met the diagnostic criteria. Therefore, individuals with BN appear to have increased comorbidity with Axis II disorders, and that this association cannot be attributed to the presence of coexisting depression.

Studies have suggested that BN individuals have higher levels of symptomatology than obese individuals with BED (e.g., Crow et al., 1996; Prather & Williamson, 1988). In support of this, individuals with BN purging type were found to have more severe general psychiatric symptoms and poorer social adjustment than individuals with BED (Hay & Fairburn, 1998). Further, females with BN were reported to have higher levels of depressive symptomatology than females with BED (Crow et al., 1996). There has been a suggestion that the severity of symptomatology escalates with the severity of binge eating (deZwaan & Mitchell, 1992).

The level of symptomatology in 107 females participating in a study on binge eating and obesity was examined (Telch & Agras, 1994). Individuals with BED were categorised into severe and moderate levels of eating disturbance, and it was found that severity of binge eating correlated significantly with all indices

of psychological distress that were measured. These included measures of global psychiatric symptomatology, depression, interpersonal difficulties, and self-esteem (Telch & Agras, 1994).

Individuals with BED have been found to have significantly higher rates of lifetime DSM-IV (APA, 1994) Axis I comorbidity compared with non-BED obese individuals (Marcus et al., 1990; Mussell et al., 1995; Specker, deZwaan, Raymond, & Mitchell, 1994; Telch & Stice, 1998; Wilfley, Friedman et al., 2000; Yanovski et al., 1993). Major depressive disorder is undoubtedly the most common diagnosis associated with BED, ranging from 46 to 58 percent (Mussell et al., 1995; Specker et al., 1994; Telch & Stice, 1998; Wilfley, Friedman et al., 2000; Yanovski et al., 1993). In contrast to this, other studies have reported no differences in the lifetime prevalence of Axis I disorders between obese BED and obese non-BED participants (Brody et al., 1994; Ricca et al., 2000). However, these studies focused on overweight participants seeking weight loss treatment programs, and may not be representative of a general BED population.

The level of comorbidity was examined in 162 individuals with BED (Wilfley, Friedman et al., 2000). The study had comprehensive exclusion criteria, and all participants met the diagnostic criteria for BED based on the DSM-IV (APA, 1994). The assessment for comorbid psychopathology was conducted using the Structured Clinical Interview for DSM-III-R (SCID-I and SCID-II). The study found that individuals with BED had extremely high rates of lifetime Axis I disorders. The most common Axis I diagnosis was for lifetime mood disorders, with almost two thirds of the participants being diagnosed with such conditions, and of these, major depressive disorder was found in almost 60 percent of cases (Wilfley, Friedman et al., 2000). However, Axis I disorders

were not found to be associated with binge eating severity. An inconsistency in this study was the use of DSM-IV diagnostic criteria for determination of the presence of BED, while utilising DSM-III-R compatible assessment instruments for the determination of other psychopathology.

The lack of correlation between Axis I general psychopathology and levels of eating disorder symptomatology suggest that although comorbid eating pathology may be an associated clinical feature of BED, binge eating is not simply a variant of another disorder, such as depression (Wilfley, Friedman et al., 2000). In support of this finding, a retrospective study of individuals with BED indicated that half the sample reported a history of clinical depression. The age of onset of binge eating appeared to precede onset of the first depressive episode (Mussell et al., 1995).

Studies based on DSM-III and DSM-III-R diagnostic criteria found that for Axis I disorders, comorbidity was 60 percent in obese BED populations. For obese non-BED populations comorbidity was found to be 34 percent (Yanovski et al., 1993). The finding for the obese non-BED group was consistent with that reported for community samples (38%; Robins et al., 1984).

Axis II diagnoses have also been found to be associated with BED. In particular, Cluster B and Cluster C disorders have been found to be significantly more prevalent among BED than non-BED individuals (Specker et al., 1994). For Axis II disorders, comorbidity was found to be 35 percent in obese BED populations. For obese non-BED populations, comorbidity was found to be 16 percent (Yanovski et al., 1993). The finding for the obese non-BED group was consistent with that found for community samples (16.7 percent; Zimmerman & Coryell, 1989). Unlike Axis I psychopathology, Axis II psychopathology was

found to be associated with more severe binge eating and overall eating pathology when baseline measures were taken (Wilfley, Friedman et al., 2000).

The association between Axis II disorders and baseline eating symptomatology suggests that BED symptomatology may be more severe when occurring in the context of a personality disorder (Wilfley, Friedman et al., 2000). Of the personality disorder clusters, only the presence of Cluster B personality disorders was associated with the baseline levels of binge eating. A limitation of this study was the failure to include a control group. Further, the assessment was based on DSM-III-R diagnostic criteria, and excluded individuals who were taking any psychotropic medication, such as antidepressants. Additionally, participants were a treatment-seeking sample and, therefore, may not be representative of all people with BED.

Studies examining comorbidity in obese individuals have found conflicting results reflecting the heterogeneity of the obese population. The majority of studies have compared obese non-BED with obese BED participants. From these studies, obese non-BED individuals were found to have lower levels of symptomatology than obese BED, and further, the levels of comorbidity for the obese non-BED group were found to be consistent with that of general community populations (Marcus et al., 1990; Molinari et al., 1997; Robins et al., 1984; Yanovski et al., 1993; Zimmerman & Coryell, 1989). No evidence was reported to indicate that moderately or severely obese individuals without BED had a higher prevalence of psychiatric disorders. In contrast to these findings, in one study, higher rates of Axis I disorders were reported in a sample of obese patients reporting for treatment (Goldsmith et al., 1992). Unfortunately, this study failed to control for obese individuals who may engage in binge eating

behaviour. Further, the higher rates of Axis I diagnoses may have been a reflection of the fact that they were a treatment seeking group. Given the findings of other studies indicating that obese BED individuals have elevated psychopathology in comparison with obese non-BED individuals, it is difficult to attribute this finding to obesity per se. Further, Telch and Agras (1994) found that severity of obesity did not correlate with any measures of global psychiatric symptomatology, depression, interpersonal difficulties or self-esteem. It may be the case that high reported rates of psychopathology in obese groups are due a proportion of group members having BED.

In summary, it appears that both BN and BED are associated with high levels of comorbid psychopathology, in particular, depression. The severity of psychopathology and symptomatology appears to be greater for sufferers of BN in comparison to BED. For obese individuals, the level of comorbid psychopathology appears to be equivalent to that of the general population.

2.8 SUMMARY

Studies to date have identified factors that distinguish BN from BED, and BED from obesity. The definitions of BN and BED are based on behavioural and psychological factors, whereas obesity is defined by body weight in comparison to body height. BN and BED have similar prevalence rates in the general community, however, each disorder has higher prevalence when examining the different at-risk groups. The at-risk group for BN is young females, whereas for BED, the at-risk group is obese females. BN and BED differ in the age of onset, with BN occurring at an earlier age. Although each disorder can have dieting or binge eating preceding the onset of the disorder,

dieting first is more common in BN, compared to binge eating first being more common in BED. Finally, there is evidence to suggest that general psychopathology and symptomatology is most evident in BN and lowest in obesity, with BED being in between the two.

CHAPTER 3

AETIOLOGICAL FACTORS

3.1 INTRODUCTION

If BN, BED and obesity represent different conditions, then it would need to be established that there are different factors to explain the onset and maintenance of each condition. Although numerous theories and factors exist to account for disordered eating in general (e.g., Bennett & Cooper, 1999; Castonguay, Eldredge, & Agras, 1995; Charpentier, 1998), it would be necessary to examine factors that are associated with the development of the individual conditions to determine if differences exist. It is recognised that there are a multitude of factors to explain the onset and maintenance of the specific manifestations of disordered eating. Examples will be considered here.

The majority of studies have focused on BN or AN, and there is limited literature examining obesity and BED. The major theories regarding the development of BN relate to restraint, stress and biopsychosocial aspects. For BED, factors tend to be extensions of those for BN. In addition to these, obesity has been linked to the development of BED. The literature on the development of obesity focuses on genetic, biopsychosocial and emotional causes. Further, the continuity theory of eating examines eating behaviour on a continuum, and incorporates normal, disturbed and disordered eating.

3.2 AETIOLOGY OF BN

The main models that have been developed to explain the onset and maintenance of BN are the stress model, restraint model, and the biopsychosocial model. The aetiology of BN is believed to result from a combination of emotional, physical, and sociological factors, and appears to be driven by societal values (Bennett & Cooper, 1999; Halmi, 1997; Zerbe, 1996). The

biopsychosocial model is the integration of these factors (Polivy & Herman, 2002). The advantage of this model is that it is able to take into account a wide range of factors believed to be influential in the development of BN (Leung, Geller, & Katzman, 1996). The disadvantage is that the model can be extremely broad, and different researchers have included a variety of combinations of factors (Polivy & Herman, 2002).

When examining the models of BN, some aspects of these overlap. For example, factors relating to peers, family and personality are included in both the stress and biopsychosocial models. Restraint is included in both the stress and restraint models. Due to the overlap, factors that have been theorised to be associated with the development of BN will be considered rather than models.

In addition to the factors that are presented below, it is well documented that negative affect and cognitions are involved in the initiation and maintenance of binge eating behaviour in BN. Negative affect and cognitions are discussed in more detail in Chapters 6 and 7, respectively.

3.2.1 Restraint

It has been proposed that dietary restraint increases the likelihood of binge eating and BN (Polivy & Herman, 1985), and has been found to be a precipitator in the development of disordered eating behaviour. Dietary restraint is defined as intentional efforts to achieve or maintain a desired weight through reduced caloric intake (Laessle, Tuschl, Kotthaus, & Pirke, 1989). One explanation of the restraint model is that prolonged dieting causes both cognitive changes, relating to food and the body, and affective changes, such as depressed

mood. These, in combination, result in a loss of control over eating (Striegel-Moore, 1995).

Another conceptualisation of the restraint model is that low self-esteem and high body dissatisfaction leads to dieting in an attempt to modify a frustrating emotive situation. The psychobiological deprivation caused by prolonged food restriction intensifies the person's susceptibility in emotionally difficult circumstances and results in compulsive overeating. Repeated attempts to prevent these episodes through further dietary restraint may lead to purging and, at the same time, increase the frequency of binge eating (Herman & Polivy, 1988; Polivy & Herman, 1985). The individual's mood worsens progressively leading to the self-perpetuation of the binge-purge cycle (Ardovini, Caputo, Todisco, & Dalle Grave, 1999).

In support of the restraint model, restraint has been found to correlate with coexistent (Jansen, Van den Hout, & Griez, 1990; Ruderman, 1985; Ruderman & Besbeas, 1992) and future bulimic symptoms (Greenberg & Harvey, 1986; Kendler et al., 1991; Leon, Fulkerson, Perry, & Early-Zald, 1995). Experiments have also demonstrated that restraint leads to disinhibited eating in the laboratory (Lowe, 1994; Wardle & Beales, 1988).

BN has been reported to begin after a period of prolonged dieting in the majority of the participants (Johnson, Stuckey, Lewis, & Schwartz, 1982). For certain vulnerable individuals, it seems that prolonged restrictive dieting may exacerbate a tendency toward bulimic behaviour, providing further support that restraint is involved in the development of BN.

Ardovini and colleagues (1999) compared 100 obese subjects with BED and 210 obese individuals without BED attending a clinic for treatment for

obesity, and 31 participants with BN. The results of this study indicated that for the BN and obese non-BED group, eating behaviour was consistent with the restraint model. That is, dietary restraint was utilised in an attempt to modify unpleasant emotional situations in individuals with low self-esteem and high body dissatisfaction.

Further evidence for restraint in the development of BN has been derived from the typical course of the disorder. Although some women with BN reported binge eating behaviour prior to any attempts to diet (17%), dieting behaviour was evident in almost all women (96%) prior to the meeting the full DSM-IV (APA, 1994) diagnostic criteria for BN (Bulik et al., 1997).

The evidence suggests that dietary restraint is involved in the maintenance of binge eating in BN, and has been hypothesised to be a causal factor. However, Stice (1998a) has proposed that binge eating may cause dietary restraint. It is possible that people who binge eat attempt to avoid consequent weight gain by dieting. Another explanation may be that both restraint and binge eating are reciprocally related (Stice, 1998a). High levels of dietary restraint were not found to predict an increase in binge eating, whereas high levels of over concern with body weight and shape were associated with an increase (Byrne & McLean, 2002). This indicates that dietary restraint, alone, cannot account for the rate of binge eating.

In summary, dietary restraint has been consistently associated with individuals with BN. Further, there is some evidence that dietary restraint is involved in the development of BN, with dieting preceding the onset of BN in an overwhelming majority of cases. However, restraint does not completely explain

the onset and maintenance of BN. Other factors, such as negative affect need to be considered to provide further information.

3.2.2 Negative Mood

Binge eating has been hypothesised to occur in an attempt to reduce or avoid unpleasant emotional states (e.g., Alpers & Tuschen-Caffier, 2001; Herman & Polivy, 1988) and has been interpreted as a stress induced response (e.g., Ganley, 1989). It has also been proposed that negative affect plays a role in the aetiology of bulimia. Theoretically, women experiencing negative affect binge and purge in an effort to regulate their aversive mood. Bingeing is thought to reduce negative affect because it provides comfort and distracts people from their emotional state. According to this theory, binge eating could be used to provide relief from both chronic negative affect and more transient bouts of negative mood (Heatherton & Baumeister, 1991).

It has been hypothesised that individuals with BN have a stronger emotional response to stressors than healthy controls. This greater reactivity refers to a higher level of reported negative emotions as well as physiological signs of emotional activation (Tuschen-Caffier & Vogele, 1999).

Individuals with BN have been found to have elevated levels of depression, anxiety and guilt relative to controls (Ruderman & Besbeas, 1992; Shisslak, Pazda, & Crago, 1990). Negative affect has also been found to correlate with symptoms of BN (Leon, Fulkerson, Perry, & Cudeck, 1993; Stice, Nemeroff, & Shaw, 1996). Individuals with BN reported increased levels of negative affect prior to binge eating than they or controls did prior to normal eating episodes (Davis, Freeman, & Garner, 1988; Lingswiler, Crowther, &

Stephens, 1989). Further, experimentally induced negative affect triggers overeating in retrained eaters (Polivy, Herman, & McFarlane, 1994). However, not all studies have found that binge eating is associated with decreased negative affect (Elmore & de Castro, 1990).

An alternative explanation may be that binge eating leads to negative affect. Further, they may be reciprocally related in a feedback cycle, where binge eating is used to relieve negative affect, which leads to increases in feelings of depression and shame, which, in turn, increases the chance of another binge (Stice, 1998a).

In summary, it is clear that negative affect is involved in the binge-purge cycle. This is discussed further in Chapter 6. Negative affect also appears to be involved in the development of BN. However, it remains unclear as to the exact mechanisms involved.

3.2.3 Stress

The impact of stress has been explored by examining both external stress and internal stress. When considering the effect of external stress on the individual, the types of situations that have been cited as precipitators are interpersonal conflict such as stressful work situations, parental and marital conflict, and unfulfilling relationships (McFarlane, McFarlane, & Gilchrist, 1988; Pyle, Mitchell, & Eckert, 1981; Sohlberg, 1990). However, studies that have examined this have produced inconclusive results. In laboratory studies, stress has found to both increase or decrease consumption of food. It is difficult to generalise these studies, given the different methods utilised to induce stress.

Stress, whether it be external or internal, being involved in the onset and maintenance of an eating disorder has been hypothesised to be associated with biological changes that occur when the body is under stress (Mauri et al., 1996). The secretion of stress hormones can influence an individual's glucose tolerance level and his or her body's ability to cope with these changes in glucose tolerance. As a consequence of this, increased appetite may ensue. It has been noted that stress can lead to poor restraint in terms of eating behaviour and to binge eating (Mauri et al., 1996).

Rather than external stress being the cause of BN, it may be that the individual's coping style has resulted in the development of the disorder. If an individual with BN has a deficit in coping skills, then they would be less able to manage stressful events. The disordered eating behaviour may be a result of a maladaptive coping style (Caffary, 1987). It has been reported that individuals with BN do not cope as well as non-eating disordered individuals. As a consequence, they experience more stress, which may result in the disordered eating behaviour in order to cope (Cattanach & Rodin, 1988).

A study of an in-patient sample of individuals with AN and BN found that both these groups reported higher levels of stress and had less confidence in their ability to be able to solve problems than non-eating disorder controls (Soukup, Beiler, & Terrell, 1990). However, it is unsure whether these findings were due to the eating disorder or were a cause of the disorder.

Eating disorder sufferers have reported more premorbid life stresses and difficulties than have controls (Raffi, Rondini, Grandi, & Fava, 2000; Schmidt Humfress, & Treasure, 1997; Welch, Doll, & Fairburn, 1997). The joint occurrence of stressful life events and affective deficiencies such as low self-

esteem, depressed mood, anhedonia, generalised anxiety, and irritability may be pathogenic for BN (Raffi et al., 2000).

Stress appears to be related to the development of BN. However, it appears to be caused by a number of factors. These may include dieting, personality, family, and cultural influences (Halmi, 1997).

3.2.4 Personality

In addition to coping style, it has been postulated that certain personality traits are associated with BN. The restrictive behaviour in relation to eating has been thought to be associated with the need for self-control. Due to this continually being unsuccessful (through binge eating and purging behaviours), the individual further develops a sense of failure and low self-esteem (Long & Cordle, 1982).

Characteristics specific to the individual in the development of an eating disorder may be due to personal experiences or personality factors (Polivy & Herman, 2002). Personality factors found to be associated with BN include impulsivity, rejection sensitivity and proneness to mood fluctuations (Johnson & Wonderlich, 1992). Personality disorders found in BN patients include dependent personality (38%; Gartner, Marcus, Halmi, & Loranger, 1989), borderline personality (Conners & Morse, 1993; 47%; Yager, Landsverk, Edelstein, & Hyler, 1989) and histrionic personality (53%; Powers, Coovert, Brightwell, & Stevens, 1988). Premorbid psychiatric disorders have been found to be a risk factor for developing BN (Fairburn, Welch, Doll, Davies, & O'Connor, 1997).

In summary, personality does appear to be a risk factor for the development of an eating disorder. There is not one particular personality disorder or trait that is associated with the development of BN. Therefore, other factors must be assumed to be involved.

3.2.5 Abuse and Trauma

The influence of child abuse is complex (Polivy & Herman, 2002). There does appear to be a connection between childhood sexual or physical abuse and bulimic symptomatology (Conners & Morse, 1993; de Groot & Rodin, 1999; Everill & Waller, 1995; Fairburn et al., 1997; Waller 1993). However, childhood sexual abuse has also been associated with depression and other psychological disturbances (de Groot & Rodin, 1999; Polivy & Herman, 2002; Vize & Cooper, 1995).

The results of research on childhood sexual abuse have been contradictory. In one study, BN sufferers were found to have the same incidence of childhood sexual abuse in comparison to the general population, although severity of the abuse may have been greater (Groth-Marnat & Michel, 2000). In another study, women with BN were found to have elevated rates of childhood abuse in comparison with non-BN women (Léonard, Steiger & Kao, 2003). However, for childhood sexual abuse the differences between individuals with and without BN were less than that for childhood physical abuse. Traumatic events such as childhood sexual abuse or serious illness of a close relative or friend have been reported to increase the risk of eating disorders (Oppenheimer, Howells, Palmer, & Chaloner, 1985).

The increased rate of childhood sexual abuse in a nonclinical sample suggests that an association exists, but does not indicate the nature of the mediating links. It is possible that childhood abuse leads to several forms of psychopathology, BN included, by magnifying a sense of personal helplessness and body dissatisfaction, and reducing self-esteem (Polivy & Herman, 2002). This association does not appear to be specific to BN, since the reported rates of abuse in BN subjects were comparable to those of women with depression.

3.2.6 Peers and Family

Peer influence has also been cited as a contributor to eating disorders (Levine, Smolak, Moodey, Shuman, & Hessen, 1994; Pauls & Daniels, 2000; Shisslak et al., 1998; Stice, 1998b; Wertheim, Paxton, Schutz, & Muir, 1997). Adolescent girls learn certain attitudes and behaviours, such as dieting and purging, from their peers (Levine et al., 1994). It is difficult to weigh the relative importance of peer influence. Some studies have suggested that peers are more influential than the media (Stice, 1998b), others have reported the opposite (Wertheim et al., 1997), whereas other studies have found that both peers and the media influence the development of BN (e.g., Young & McFatter, 2001).

Family functioning has been theorised to impact on the development of eating disorders (e.g., Fariburn et al., 1997; Minuchin, Rosman, & Baker, 1978; Pauls & Daniels, 2000). Studies have found that families tend to be enmeshed, intrusive (Minuchin et al., 1978), less cohesive and expressive (Latzer, Hochdorf, Bachar, & Canetti, 2002), less warm, more over protective (Wade, Treloar, & Martin, 2001) and overly concerned with parenting (Shoebridge & Gowers, 2000). Further, increased levels of negative interaction and conflict (Grissett &

Norvell, 1992) and evidence of attachment problems have been reported (Ward, Ramsay, & Treasure, 2000; Ward, Ramsay, Turnbull, Benedettini, & Treasure, 2000). However, it is unsure whether problems with attachment are secondary or causative in relation to the eating disorder (Polivy & Herman, 2002), with one study finding family functioning to be a poor predictor of bulimic behaviour (Young & McFatter, 2001). Parents with psychiatric disorders also increase the risk of BN (Fairburn et al., 1997).

Individuals with eating disorders generally described a critical family environment, featuring coercive parental control (Haworth-Hoeppner, 2000) and less encouragement of personal growth (Latzer et al., 2002). Adolescents who perceived family communication, parental caring, and parental expectations as low and those who report sexual or physical abuse were at increased risk of developing eating disorders (Haudek, Rorty, & Henker, 1999; Neumark-Sztainer, Story, Hannan, Beuhring, & Resnick, 2000).

BN sufferers reported greater parental intrusiveness, specifically maternal invasion of privacy, jealousy, and competition, as well as parental seductiveness (Rorty, Yager, Rossotto, & Buckwater, 2000). In contrast, perceived parental encouragement of autonomy is associated with less dieting behaviour (Strong & Huon, 1998), possibly serving a protective function against eating disorders. The families of BN sufferers have been described as not having clear boundaries between roles of children and adults, and mothers tend to be emotionally unavailable often due to their own problems (Striegel-Moore, 1993).

A family history of obesity and a mother's own concerns about her own body shape and continuous efforts to diet are risk factors for adolescent girls (Levine et al., 1994). Further, external control of food intake and rules relating

to family meal times were significant predictors of BN (Crowther, Kichler, Shewood, & Kuhnert, 2002). Mothers of eating disorder sufferers are themselves more eating disordered than are mothers of girls who do not have eating disorders (Pike & Rodin, 1991). However, most studies of family functioning are correlational, making it difficult to determine whether family dysfunction contributes to eating disorders, eating disorders contribute to family dysfunction, or some common factor contributes to both.

If negative family influences were in fact responsible for the development of eating disorders, the question would remain as to exactly how a dysfunctional family induces eating disorders. It may be that families can cause eating concerns, but it may not be sufficient for the emergence of an eating disorder. There may some additional factors related to the individual (Steiger, Stotland, Trotter, & Ghadirian, 1996). For example, women with BN perceived less support from family and friends (Grissett & Norvell, 1992). Alternatively, it has been reported that individuals with BN have access to a similar level of social support as non-eating disordered controls. However, the BN group reported being dissatisfied with this support (Jacobson & Robins, 1989).

In summary, the influence of peers and family appears to contribute to the development of BN. Attitudes and behaviours have been found to be affected by peers, and a number of studies have reported problems in family functioning. Although these factors provide some understanding into the aeitology of BN, again, they cannot fully explain the development of BN.

3.2.7 Cultural Factors

Cultural factors have been found to impact on the development of eating disorders. Originally, eating disorders were more common in Western Societies (e.g., Pate, Pumariega, Hester, & Garner, 1992). However, more recently the prevalence in Eastern societies has been reported to be similar (Rathner et al., 1995). This may be related to increasing exposure to Western cultures in these societies. Although eating disorders typically occur in cultures in which food is plentiful, this cannot be considered a cause; it does cause an increase in the likelihood that an individual will go on to develop an eating disorder (Polivy & Herman, 2002).

The media has been implicated in the increasing incidence of eating disorders (Polivy & Herman, 2002; Shaw, 1995). Fashion magazines have been reported to impact on the level of body satisfaction in adolescents (Shaw, 1995). The portrayal of images of slim physiques of models and celebrities, and a distorted reality of body size, as depicted in the media, have been theorised to impact on the development of eating disorders. Individuals with eating disorders have been found to be more influenced by the media than non-eating disordered individuals (Murray, Touyz, & Beumont, 1996).

Eating disorders have been found to be more prevalent in females than males (e.g., APA, 1994; Striegel-Moore 1993, 1997). The desire for thinness is more common and abundant in females than males, and females are also more likely to express dissatisfaction with their shape and weight. Body dissatisfaction can be regarded as an essential precursor (and continuing accompaniment) of eating disorders. The more intense the dissatisfaction, the more likely that one will attempt to lose weight. When this is combined with

other factors, the individual may go on to develop an eating disorder (Polivy & Herman, 2002). The sociocultural influence of the thin ideal was readily apparent in profiles of the normal-weight women, indicated by their high scores on body dissatisfaction (measured by the EDI) (Kenny & Adams, 1994).

According to Polivy and Herman (2002), media images are at best background causes of eating disorders. Exposure to the media is so wide spread that if such exposure were the cause of eating disorders, then it would be difficult to explain why anyone would not have an eating disorder. However, the impact of the media on individuals at risk of eating disorders may be complex due to a number of other factors. An example of this could be obesity, that has been found to be a risk factor in the development of BN (Fairburn et al., 1997).

3.2.8 Summary

The aetiology of BN is complex, and appears to be a result of a combination of factors. The problem in examining these factors is that often it is difficult to denote which of these factors are primary influences on the development of the disorder, and which are secondary. Factors impacting on the development of BN range from individual components through to broader, cultural components. All of these play a role in the development when considered together, but when considered in isolation, it is obvious that alone, they do not cause the eating disorder. It may be that it is necessary for a combination of factors to be present before BN develops and that the components of this combination vary between individuals.

3.3 AETIOLOGY OF BED

Factors associated with the onset and maintenance of BED have typically been derived from those of BN (Castonguay et al., 1995). These factors have been investigated to the extent to which the concepts and techniques used for BN are applicable to BED.

BED has been theorised to be a less severe form of eating disorder than BN, or that individuals with BED are 'burned out' BN sufferers. However, there is evidence to suggest that this is not the case. Individuals with BED have been found to have a significantly earlier age of onset of binge eating than BN, and a later onset of the condition. Also, different patterns for the onset of dieting in the two groups have been found, and the majority of the individuals with BED have never met the diagnostic criteria for BN. This indicates that the group is not simply a 'burned out' form of BN (Marcus, Wing, & Lamparaski, 1985).

3.3.1 Restraint

Restraint has been found to be an important factor in the development and maintenance of BN (e.g., Ardovini et al., 1999; Polivy & Herman, 1985) and, therefore, it would be important to examine the relationship between restraint and BED. As BN is often a response to restricted eating, it is not surprising that a high proportion of obese individuals on a weight loss program reported binge eating. Overweight people are under constant pressure to diet, and the major difference between drastic dieting in the obese and in individuals with BN is that dieting in obese individuals is endorsed by current medical opinion. (Garner 1993 in Beumont, Garner, & Touyz, 1994).

The restraint model was examined in a group of obese BED individuals, in comparison to obese non-BED and BN groups (Ardovini et al., 1999). For the obese BED group, the results did not support the restraint model. High levels of disinhibition were not associated with high levels of cognitive restriction. Individuals with BED have been found to have lower levels of restraint than those with BN (e.g., Masheb & Grilo, 2000; Sullivan, 2001).

The course of BED provides further evidence to indicate that restraint is not essential in the aetiology (Howard & Porzelius, 1999). Dieting has been reported to be an aspect of behaviour in individuals with BN, but research indicates that binge eating often precedes the onset of dieting in this group (e.g., Mussell et al., 1995, 1997; Santonastaso et al., 1999; Spitzer et al., 1992; Wilson, Nonas, & Rosenblum, 1993).

Restraint has not been found to be associated with the onset of the diagnostic condition of BED. However, restraint has been reported to be an antecedent to binge eating behaviour for individuals with BED (le Grange, Gorin, Catley, & Stone, 2001). It may be that an escalation in binge eating behaviour results in the development of dietary restraint, rather than dietary restraint leading to binge eating. Individuals with BED develop binge eating behaviour that results in weight gain, and that dietary restraint is a response to the weight gain.

In summary, dietary restraint does appear to be involved in binge eating behaviour in individuals with BED. However, the course of BED indicates that restraint is not associated with the aetiology of this condition.

3.3.2 Negative Mood

Negative mood has been found to be a factor associated with the development of BN (e.g., Shisslak et al., 1990). Binge eating for individuals with BED has also been reported to be related to negative mood (e.g., Lingswiler et al., 1989). The relationship between BED and emotions is examined in more detail in Chapter 6. However, it is important to highlight evidence for negative mood to be associated with the onset of BED in this section.

Individuals with BED were compared with individuals without an eating disorder, those with other psychiatric disorders and those with BN to determine specific risk factors (Fairburn et al., 1998). In comparison to non-eating disordered individuals, one factor that appeared to impact on the development was a negative view of self.

An obese BED group were found to have high levels of depressive symptomatology. Ardovini and colleagues (1999) concluded that binge eating in this group might be linked to negative emotional states rather than dietary restraint. Previous literature has also related binge eating in BED to negative emotional states (e.g., Ganley, 1989; Marcus et al., 1992; Womble et al., 2001). In respect to treatment, high levels of negative stress was associated with slower reductions in binge eating levels (Pendleton et al., 2001).

In summary, negative mood does appear to be related to BED. There is evidence to show that negative mood is involved in binge eating behaviour, and also seems to be related to the onset of BED.

3.3.3 Peers and Family

The family characteristics of individuals with BED have not been studied as extensively as those of individuals with BN. However, Fairburn and colleagues (1998) reported that disparaging comments regarding body and food from family was a specific risk factor in the development of BED. Further, negative comments from family members in relation to body and food differentiated BED from a general psychiatric group (Fairburn et al., 1998).

In a comparison of BED individuals and a non-eating disordered control group, the family environment was rated as less supportive and cohesive by the BED group (Howard & Porzelius, 1999). In comparison to obese non-eating disordered individuals, those with BED rated their family as less cohesive, independent, expressionless, and less affectionate (Fowler & Bulik, 1997).

The most comprehensive study to date examining the family characteristics of individuals with BED was conducted by Hodges, Cochrane, and Brewerton (1998). Comparisons were made with individuals with AN, AN-BN, and BN, as well as with existing normative data. In comparison to the eating disorder groups, the BED group was reported to have significantly lower levels of cohesiveness, expressiveness, and independence. They described increased levels of conflict compared to the AN and AN-BN group, at a similar level to the BN group. The BED group reported more isolation and a sedentary lifestyle, with decreased structure and consistency within the family (Hodges et al., 1998).

In comparison to normative data, individuals with BED described their family as having less cohesiveness, expressiveness, and independence. The family also had higher levels of conflict and more rigidity (Hodges et al., 1998).

In summary, given the limited amount of research in the area of family and peers in BED groups, there is evidence that this group has higher family psychopathology than non-eating disordered families. Further, this level appears to be greater than that for AN families, and similar to that of BN families (Hodges et al., 1998).

3.3.4 Obesity

Childhood obesity was found to be a specific risk factor for the development of BED, and differentiated BED from a general psychiatric group (Fairburn et al., 1998). However, obesity was found to be a risk factor for both BN and BED. Further, a family history of obesity and early onset obesity was common in individuals with BED (Marcus et al., 1992).

Although obesity has been found to be a risk factor for the development of BED, for many individuals, obesity has been found to develop several years after the onset of binge eating (e.g., Haiman & Devlin, 1999; Mussell et al., 1995).

3.3.5 Summary

In summary, evidence for factors involved in the aetiology of BED have not been as extensively researched as those for BN. However, from the information available, there is some evidence that BED, like BN, is caused by a combination of both individual and broader factors. In contrast to BN, restraint does not appear to be involved in the aetiology of BED. Negative affect, dysfunctional family and childhood or family obesity have been related to the development of BED to date.

3.4 AETIOLOGY OF OBESITY

BED has been found to occur in a subset of obese individuals. Therefore, it is important to consider the factors that have been reported to be associated with the onset and maintenance of obesity. The prevalence of obesity is increasing (Jéquier, 2002) and, therefore, an understanding of how obesity develops would allow for better management and prevention. Research has indicated that the cause of obesity appears to be multidetermined in the majority of cases (Jéquier, 2002; Kuldau, Rand, & Tucker, 1982).

Two main theories have been postulated with regard to the aetiology of obesity. The set-point theory (Nisbett, 1972) focuses on a possible genetic cause for obesity. Other researchers have argued that environmental and behavioural factors provide an explanation for the development of obesity (Jéquier, 2002). This includes the concept of emotional eating which has been examined as a means of explaining obesity (e.g., Kaplan & Kaplan, 1957).

3.4.1 Genetic-based Theories

Nisbett (1972) first introduced the set-point theory of obesity. This theory postulated that an individual's weight is genetically determined to be at a set point, and their weight fluctuates around this point. In addition to genetic determination, metabolic and dietary factors also impact on an individual's set point (Kuldau et al., 1982).

Set-point theory states that many obese individuals are actually below their own biologically determined equilibrium weight, or set-point. Set-point is presumed to vary with number of fat cells (adipocytes) in the body. It has been suggested that many obese people possess an abnormally high number of

adipocytes as a result of genetic inheritance and/or early overfeeding and must constantly overeat (and remain overweight) in an attempt to meet the biological demands imposed by these cells. Social pressures may inhibit eating by these individuals, resulting in a person who is both overweight according to cultural standards and underweight according to their set-point. In addition, they tend to be chronically restrained with respect to eating (O'Neil et al., 1981).

Evidence for the set-point theory comes from studies of weight loss programs. The majority of individuals following cessation of the program return to their pre-program weight (Kaldau et al., 1982). Another study that provides support for set-point theory of obesity, employed healthy males who had their calorie consumption either halved or doubled. Weight loss evened out at 15 percent of the starting weight, and weight gain was 14 percent of initial weight. Further, at the conclusion of the experiment, the majority of the participants weight returned to pre-experimental levels (Keesey, 1980).

Genetic and environmental factors were examined in the development of obesity (Bulik, Sullivan, & Kendler, 2003). From this study, it was concluded that the development of obesity is largely due to genetic factors with common environmental factors having little involvement. Further, obesity and binge eating did not share a direct causal pathway, implying that these two conditions are distinct.

Genetic theories of obesity provides an explanation for obesity in some individuals, however, it does not offer a justification as to why the incidence of obesity is increasing at such a rapid rate. In addition to genetic causes, psychosocial and environmental factors may also contribute to the aetiology of obesity.

3.4.2 Biopsychosocial Theory

According to Jéquier (2002), body weight regulation is affected by three factors; genetic, environmental and psychosocial. It has been argued that the increase in the prevalence of obesity occurring worldwide provides evidence that this has occurred as a result of changes in environment and behaviour, rather than being caused by genetic modifications.

Excessive intake of food may not only be reflective of food amount. Food type has been shown to have varying effects on satiation (a reduction in the levels of hunger indicating the end of eating) and satiety (the length of time between meals when the individual reports not feeling hungry). Meals that have a higher fat content have less satiating effects than meals high in protein and carbohydrates (Prentice, 1998).

Consumption of food that has been prepared away from the home was reported to have increased from 18 to 32 percent over the past 16 years. Further, meals and snacks prepared away from the home contained more calories per eating occasion, and had higher levels of total fat and saturated fat on a per calorie basis (Guthrie, Lin, & Frazao, 2002).

Although a high fat diet can be factored in the development of obesity in some individuals, it is not adequate to explain the increasing prevalence. Further, some individuals are able to consume a high-fat diet without the associated weight gain (Ravussin & Swinburn, 1993).

Eating in response to an emotional state has been studied in obese individuals. Kaplan and Kaplan (1957) suggested that obese individuals eat in response to feelings of anxiety. Eating causes the negative emotional state to

decrease. Eating in obese people occurs in reaction to both hunger and anxiety, with these two states becoming indistinguishable.

Brunch (1973) proposed that overeating in the obese was due to failure to learn hunger and satiation cues. This results in the individual being unable to differentiate hunger and negative emotions. In support of this, emotional eating has been found to be most frequent when people are alone, when the meal is a snack, and when eating at home (Baumeister et al., 1994).

Emotions have been found to influence eating behaviour in people in general. For obese individuals, this effect has been reported to be stronger than that of non-obese individuals (Canetti, Bachar, & Berry, 2002). Meals eaten when mood was either positive or negative were reported to be significantly larger than those eaten during a neutral mood. Further, a negative mood had the greatest impact (Patel & Schlundt, 2001).

Theories on obesity have compared obese individuals with and without BED. Interestingly, family functioning was not found to be a factor associated with obesity, whereas it has been reported to be a factor associated with BED (Johnson, Brownell, St Jeor, Brunner, & Worby, 1997).

3.4.3 Summary

There is evidence that aetiology of obesity is multidetermined. Factors such as genetics, metabolism, activity levels, adipocyte levels, food availability, learned behaviour, cultural practices and individual psychology all appear to impact on the development of obesity.

Treatment options for obesity reflect the fact that many factors can be involved in the development. Treatment ranges from weight reduction programs,

behaviour programs, psychotherapy, medication and surgery (Kuldau et al., 1982).

3.5 CONTINUITY AND DISCONTINUITY HYPOTHESES

The continuity hypothesis was originally proposed by Nylander (1971), and theorises that eating disorders occur on a continuum, with normal non-eating disordered behaviour at one end, eating disordered at the other end, and disturbed eating behaviour in between. Eating disorders result from more extreme behaviours, such as more extreme dieting behaviour and weight concern. The continuity hypothesis implies that differences between the groups are quantitative, not qualitative. A number of studies have found evidence to support the continuity hypothesis (e.g., Franko & Omori, 1999; Hsu, 1990; Kenny & Adams, 1994; Lowe et al., 1996; Scarano & Kalodner-Martin, 1994; Stice, Killen et al., 1998a).

The discontinuity hypothesis, in contrast, suggests that eating disorders are categorically different from normal eating or disturbances in eating (Brunch, 1973; Crisp, 1980). Studies have also found evidence to support this theory (e.g., Prather & Williamson, 1988; Ruderman & Besbeas, 1992).

There have been some studies that have found support for both the continuity and discontinuity models, with different variables supporting the different models. Stice, Killen and colleagues (1998a) reported that inconsistencies may arise when testing different aspects of the disorder.

The majority of the studies have focused on females. One study that has considered males found some evidence for the both the continuity and discontinuity models (Tylka & Subich, 2002). The participants were divided into

asymptomatic, symptomatic and eating disorder groups. The findings indicated differences between males and females in terms of the eating continuum.

3.5.1 Continuity hypothesis

The continuity hypothesis has most commonly been related to individuals with normal eating, those pre-occupied with weight, restrictive eating, sub-threshold BN and BN. Studies have typically excluded individuals with AN, as the behaviour of this group has been found to be qualitatively different, and binge eating is not included in their behavioural repertoire (e.g., Garner, Olmstead, & Garfinkel, 1983; Garner et al., 1984). It may be that a continuum exists from normal eating to AN, which may be related to the normal eating to the BN continuum in some aspects (Scarano & Kalodner-Martin, 1994).

Evidence for the continuity model has been reported in a number of studies (e.g., Drewnowski, Yee, Kurth, & Krahn, 1994; Franko & Omori, 1999). A comparison of individuals with BN, current dieters, restrained non-dieters, and unrestrained non-dieters on both general and eating disorder specific psychopathology found evidence to support the continuity model (Lowe et al., 1996). This particularly related to the degree of weight concern and dietary restraint.

A discriminant function analysis was utilised to examine differences between women with BN, subthreshold BN and non-eating disorder controls. Pair-wise comparisons indicated that the continuity hypothesis was best able to describe the groups for measures of both weight concern and psychopathology. No evidence found for the discontinuity hypothesis (Stice et al., 1998a).

A sample of female university students was examined based on eating pathology, depression and behaviours and cognitions commonly associated with eating disorders. Support was found for the continuity hypothesis, with higher levels of eating pathology being related to increased degree of depression and cognitions and behaviours associated with eating disorders (Franko & Omori, 1999). A limitation with this study was that group allocation was based on self-report and not on clinical interview, which has been reported to be a less accurate method for measuring the occurrence and frequency of the key behavioural features of eating disorders (Luce & Crowther, 1999).

The theory of an eating disorder continuum was examined in relation to personality, psychological, behavioural and cognitive factors (Tylka & Subich, 1999). The participants were a sample of college women. Results supported the notion of an eating disorder continuum, with asymptomatic, symptomatic and eating disordered groups being quantitatively different.

BED is a relatively new diagnostic category. There is evidence to suggest that obese individuals with binge eating are a distinct subgroup in the obese population (e.g., Fichter et al., 1993; Marcus et al., 1990; Telch & Agras, 1994; Yanovski et al., 1993). Recent studies have examined BED in terms of the continuity theory (Fitzgibbon et al., 2003; Gleaves, Lowe, Snow, Green, & Murphy-Eberenz, 2000).

General psychopathology was found to distinguish individuals with BN, BED and obese non-BED. The BN group had the highest level of general psychopathology, the obese group the lowest, with the BED group being in between the two (Fichter et al., 1993).

A comparison between obese non-BED individuals, subthreshold BED, BED, subthreshold BN and BN was made, examining core eating pathology and comorbid symptoms (Fitzgibbon et al., 2003). Evidence was found to support the continuity model of eating disorders. The five groups could be differentiated on drive for thinness and body dissatisfaction, as well as measures of depression and interoceptive awareness.

The continuity model provides a possible explanation of the development of eating disorders. The behaviours of individuals with eating disorders are more extreme versions of normal behaviours. There is evidence that non-eating disordered individuals engage in behaviours and have similar cognitions, but these are less extreme than those of eating disordered individuals.

3.5.2 Discontinuity Hypothesis

Evidence for the discontinuity hypothesis has been reported in a number of studies comparing individuals with eating disorders, eating disturbance and non-eating disorder controls. This hypothesis proposes that eating disorders are categorically different.

In a comparison of individuals with BN, those who diet and non-eating disordered controls, there were a number of differences between the BN group and the diet group. However, there were fewer differences between the diet group and the non-eating disordered control groups (Ruderman & Besbeas, 1992). Sixteen factors distinguished the BN and diet groups, but only six distinguished the diet and control groups. This indicates qualitative differences between the BN and the other two groups. However, it may have been that the

non-eating disordered and dieting groups occur at a similar point on the eating continuum and, therefore, the quantitative differences were small between them.

Although minimal, there is some evidence for the discontinuity model for BN and BED. Factors that discriminated between obese non-BED individuals, subthreshold BED, BED, subthreshold BN and BN, were found not to discriminate between BED and subthreshold BN (Fitzgibbon et al., 2003). No significant difference was found between these two groups on the variables drive for thinness, interoceptive awareness and depression.

3.5.3 Summary

Evidence from the literature has generally been found to support the continuity hypothesis. Factors that are typically related to eating disorders have been found to occur to a lesser degree in non-eating disordered groups. The discontinuity hypothesis has less empirical evidence, however, there are some groups or factors that have not differentiated. This implies that some factors are specific to eating disorders, and that some groups are more similar than others on some of these factors.

3.6 SUMMARY

In summary, there are many factors that have been identified as being involved in the development of BN, BED, and obesity, indicating that they are all multidetermined. There appears to be some overlap of these factors between the three groups. The continuity hypothesis explains this in terms of factors being more extreme in eating disorders, to a lesser extent in eating disturbances,

and even less in normal eating behaviour. There is evidence to suggest that this may be the case for some factors.

Evidence from empirical studies provides support for the continuity model. There are some factors that have not distinguished groups. For example, subthreshold BN and BED were unable to be distinguished in one study (Fitzgibbon et al., 2003). However, in general, factors have been demonstrated to be consistent with the continuity theory.

Development of BN has been reported to be associated with a wide variety of factors. This ranges from the society in which the individuals is raised though to specific traits of the person. These factors appear to combine, leading to the development of BN. A culture that portrays thin ideals in the media, dysfunctional family, a history of abuse, an inability to manage stress, negative mood and dietary restraint have all been found to be associated with the aetiology of BN. For BED, there has been less investigation into the aetiology. In contrast to BN, restraint does not appear to be associated with the development OF BED. Factors relating to negative mood, obesity and dysfunctional family have been linked to the aetiology of this condition.

Obesity has been considered to be genetic, however, this alone cannot explain the current increasing prevalence. Other factors associated with the aetiology include availability of certain food and eating in response to negative emotional states.

In summary, there appear to be some factors that are specific to the development of each of these conditions. Not one factor alone is able to explain the aetiology of BN, BED or obesity. The combination of factors is complex.

CHAPTER 4

SYMPTOMATOLOGY AND BEHAVIOUR OF BINGEING

4.1 INTRODUCTION

The clinical features of BN have been well-defined, however, much less is known about the clinical features of BED. BED has been listed in the DSM-IV as a provisional diagnostic category. Some researchers have questioned whether BED is a form of non-purging BN (Fairburn et al., 1993; Raymond et al., 1995), or that it occurs in a subset of individuals with obesity (deZwann et al., 1992). Other researchers have argued that there is sufficient evidence to indicate that it is a separate diagnostic entity (Geliebter et al., 2001). By using standardised assessments to compare BED to other eating disorders, especially BN, and with non-eating disordered controls, it is possible to characterise the specific eating symptomatology of BED.

As previously stated, the binge eating behaviour of BN and BED are defined identically in the DSM-IV (APA, 1994), with further diagnostic information about binge eating provided for BED. It would be important to identify food selection and amount of food eaten in both disorders to enable more detailed comparisons between the two groups.

4.2 EATING SYMPTOMATOLOGY

Many studies have examined the eating symptomatology related to BN and BED. Studies have made comparisons between a number of different groups to provide information regarding the individual features for each disorder, as well as examining the severity of symptoms. Individuals with BN have been compared to individuals with high levels of dietary restraint (e.g., Wilson & Smith, 1989), AN (e.g., Cooper, Cooper, & Fairburn, 1989), BED (e.g., Striegel-Moore et al., 2001), and non-eating disordered controls (e.g., Cooper et al.,

1989). Commonly, BED has been compared with BN, overweight non-BED individuals (e.g., Wilfley, Schwartz, Spurrell, & Fairburn, 2000) and normal weight controls.

Although other assessment instruments have been utilised to examine differences in eating symptomatology in the literature, the Eating Disorder Examination (EDE; Fairburn & Cooper, 1993) and Eating Disorder Inventory (EDI-II; Garner, 1990) have been the most widely used. Both the EDE and EDI have been found to be valid and reliable measures (Fairburn & Beglin, 1994 and Welch, 1988, respectively). However, Fairburn and Beglin (1994) compared interviewer based assessment in comparison to self-report questionnaires. It was found that higher rates of eating psychopathology were generated by the self-report questionnaire. It was concluded that a clinical interview is likely to produce more accurate results than self-report questionnaires.

Moreover, in a study comparing BN with chronically restrained eaters that employed both the EDI and the EDE (Wilson & Smith, 1989), it was found that the EDE was better able to discriminate between the two groups. Only the Bulimia subscale discriminated between individuals with BN and those with restrained eating on the EDI, whereas the Shape, Weight and Eating Concern subscales of the EDE differentiated between the two groups. It was concluded by the authors that the EDE is a superior measure for examining differences between these populations. This is supported by other studies that have found that the EDE is the most well-validated investigator-based interview of eating psychopathology, and is the instrument of choice when assessing the specific symptomatology of eating disorders (Rosen & Srebnik, 1990; Smith, Marcus, & Eldredge, 1994). Given that the EDE or the EDI have been utilised to examine

the levels of eating symptomatology, each questionnaire will be considered separately below.

4.2.1 Eating Disorder Examination (EDE)

The EDE (Fairburn & Cooper, 1993) measures eating symptomatology that has been found to relate to eating disorders. The scale consists of four subscales, Restraint, Shape Concern, Weight Concern, and Eating Concern. There are two forms of the EDE, one that comprises a semi-structured interview, and another that is in the form of a self-report questionnaire (EDE-Q). The mean subscale results from a number of studies have been tabulated below to show differences across subscales and between groups.

Table 1.

Summary of EDE subscale scores for a number of different groups from a variety of studies.

Study	Group	Restraint	Eating Concern	Weight Concern	Shape Concern
Cooper et al. (1989)	AN	3.2	2.2	2.4	2.9
Wilson & Smith (1989)	BN	3.3	2.4	4.0	3.8
Hay & Fairburn (1998)	BN	3.5		3.6	3.9
Cooper et al. (1989)	BN	3.1	2.4	3.1	3.6
Striegel-Moore et al. (2001)	BN-P			4.3	4.6
Striegel-Moore et al. (2001)	BN-NP			4.5	4.7
Striegel-Moore et al. (2001)	BED			4.0	4.4
Barry et al. (2002)	BED	2.6	3.9	4.2	5.0
Hay & Fairburn (1998)	BED	2.5		2.9	3.3
Wilfley, Schwartz et al. (2000)	BED	1.8	1.8	3.4	3.9
Marcus et al. (1992)	BE	2.2	2.8	3.8	4.0
Wilson & Smith (1989)	RE	3.2	1.3	2.1	2.6
Wilfley, Schwartz et al. (2000)	OW	1.7	0.6	1.9	2.0
Cooper et al. (1989)	NW	0.9	0.2	0.5	0.6

(Bulimia Nervosa [BN], Bulimia Nervosa Purge type [BN-P], Bulimia Nervosa non-purge type [BN-NP], Binge Eating Disorder [BED], Obese Binge Eaters [BE], Restrained Eaters [RE], Overweight [OW], Normal Weight [NW])

From Table 1 it can be seen that eating symptomatology for both the BN and BED groups was elevated on the subscales Eating, Weight and Shape

Concern. A consistent difference was found on the subscale Restraint, with the BN group demonstrating higher levels than the BED group. The OW group had similar levels of Restraint as the BED group, but reported lower levels of Eating, Weight and Shape Concern. The normal weight, non-eating disordered control group had the lowest scores on each of the subscales.

The studies indicated in Table 1 will be considered in further detail to examine what statistical differences the authors reported between the groups. Marcus et al. (1992) administered the EDE to 17 obese women seeking treatment for binge eating problems and compared results with a normal weight BN group from a previous study (Wilson & Smith, 1989). There were only significant differences reported between the two groups on Restraint. Obese women seeking treatment for binge eating reported similar levels of eating disorder symptomatology that was comparable to the normal weight BN group. Although they did not report as high levels of dietary restraint as the BN group, they have been found to have higher levels than obese individuals who do not binge eat (Marcus et al., 1985).

There has been some discussion about the overlap between the diagnostic criteria for BED and BN, especially for nonpurging BN (Fairburn et al., 1993). It has also been discussed whether BED may be a form of "burned out" BN (Raymond et al., 1995). Hay and Fairburn (1998) used a general population sample and compared BN nonpurging type and BED. Utilising the EDE, and measures of general psychiatric symptoms and social functioning, these authors found that BN purge type had more severe eating disorder symptoms. Further, a graduation of eating disorder severity from BED (least severe) to BN nonpurging type to BN purging type (most severe) was reported. The data supported a

distinction between BN nonpurging type and BED, and indicated a continuum of severity of symptoms. In addition to this, deZwaan and Mitchell (1992) found strong evidence for a continuum of severity with respect to the behavioural and attitudinal parameters of binge eating rather than a dichotomy of individuals with binge eating versus individuals without binge eating.

Another study compared BN purge type, BN nonpurge type and BED, using the EDE-Q (Striegel-Moore et al., 2001). Only the Weight and Shape Concern subscales were reported, and no differences between the three groups on either subscale were found. This is consistent with the finding of Marcus and colleagues (1992). The BED group was significantly more likely to meet the diagnostic criterion for obesity compared with women with BN (Striegel-Moore et al., 2001). The authors concluded that obesity is a distinguishing feature between the syndrome of BED and the syndrome of BN, regardless of subtype.

In a well-designed study by Wilfley, Schwartz et al. (2000), comparisons between BN, BED, AN, normal weight and overweight participants were made, and a number of differences were reported. This study utilised AN, BN, and normal weight data for comparisons from Cooper et al. (1989). It was reported that the BED group had significantly lower restraint than the AN and BN groups. Eating Concern in BED was similar to AN but significantly lower than BN. Weight and Shape Concern in BED was comparable to BN but significantly higher than AN. There was significantly more Eating, Weight, and Shape Concern in BED than both the normal weight and overweight control groups, indicating more eating symptomatology. Restraint in BED was similar to overweight and significantly higher than normal weight participants. It was concluded that the difference between BED and overweight individuals on the

Eating Concern subscale may be useful for discriminating between eating-disordered behaviours and attitudes from normative behaviours and attitudes of overweight individuals. The high score on the Weight and Shape Concern subscales for the BED group indicated the over importance of weight and shape in self-evaluation may be as relevant for BED as it is for AN and BN (Wilfley, Schwartz et al., 2000).

Individuals with BN were divided into those whose binge eating episodes were subjective or objective, and the groups were compared on differences between eating symptomatology (Pratt, Niego, & Agras, 1998). An objective binge, as defined by Fairburn (1987), consists of both the consumption of a large amount of food and the experience of a loss of control over eating. For an interviewer to make this assessment, knowledge of the amount of food that would usually be consumed in similar circumstances is required. Fairburn (1987) defined a subjective binge as consumption of an amount to food not considered excessive, where the individual still experiences a feeling of loss of control (Fairburn, 1987). Pratt et al. (1998) found no significant differences between the two groups on measures of eating symptomatology as measured by the EDE, or any demographic measures. The similarity raises questions regarding the diagnostic criteria for BN as defined by the DSM-IV, which states that the amount of food consumed during a binge is "definitely larger than most people would eat" (APA, 1994, p.549). In addition to this finding, no differences were found on measures of psychopathology and demographics between those individuals with BED who consumed small binge quantities and those who consumed large binge quantities (Niegro, Pratt, & Agras, 1997). Therefore, it appears that the size of the binge is irrelevant in terms of eating symptomatology.

Eating symptomatology was compared to the frequency of binge eating and purging in individuals with BN (Wilson & Eldredge, 1991). It was reported that the frequency of binge eating was not related to the level of eating symptomatology. However, as might be expected, the frequency of purging was found to be associated with the Weight Concern subscale of the EDE.

Previous studies comparing obese individuals with BED and non-BED obese individuals have found that the two groups differ in several important ways. Eldredge and Agras (1996) considered Weight and Shape Concerns in obese individuals with BED and non-BED obese individuals, using the self-report version of the EDE (EDE-Q: Fairburn & Beglin, 1994). The results indicated that the BED group had significantly higher levels of concern for shape and weight than the non-BED obese group. They also reported that weight did not independently influence level of Shape and Weight Concerns. This suggests that Weight and Shape Concern may be a diagnostic feature of BED, rather than a consequence of obesity.

In summary, individuals with BN and BED have been found to have comparable levels of Eating, Weight and Shape Concern as measured by the EDE. People with BN have demonstrated higher levels of Restraint than individuals with BED. This indicates that these two groups have similar levels of eating symptomatology. When examining BED and overweight individuals who do not engage in binge eating, the BED group had higher levels of Eating, Weight and Shape Concern, but there was no difference in Restraint. There is some evidence of a continuum of severity of eating symptoms, with BN purge type having the most severe symptoms, followed by BN non-purge type, BED, individuals with restrained eating, overweight and then normal weight. Further,

there was little evidence that frequency of binge eating in BN, or that objective or subjective binge eating was associated with differences in levels of eating symptomatology.

4.2.2 Eating Disorder Inventory (EDI)

The Eating Disorder Inventory-II (EDI-II; Garner, 1990) is a self-report measure designed to assess psychological (cognitive) and behavioural characteristics common in eating disorders. The inventory consists of eight subscales: Drive for Thinness, Bulimia, Body Dissatisfaction, Ineffectiveness, Perfectionism, Interpersonal Distrust, Interoceptive Awareness, Maturity Fears, Asceticism, Impulse Regulation, and Social Insecurity. Mean subscale results from a number of studies have been tabulated below to compare different groups on the subscales.

Table 2.

Summary of EDI subscale scores for a number of different groups from a variety of studies.

	Wilson & Smith (1989) BN	Molinari et al. (1997) BN	Sunday et al. (1992) BN	Raymond et al. (1995) BN	Barry et al. (2002) BED	Raymond et al. (1995) BED	Molinari et al. (1997) Obese BED	Wilson & Smith (1989) Restrained	Molinari et al. (1997) Obese non-BED
Body dissatisfaction	21.0	19.9	18.8	17.1	23.7	23.1	17.0	18.4	17.1
Bulimia	11.5	12.7	11.4	10.7	12.6	8.1	9.5	3.3	3.3
Drive thinness	14.2	14.5	12.2	13.3	13.5	8.7	9.5	10.4	6.3
Ineffectiveness	10.9	14.7	12.6	10.4	11.9	4.6	7.6	3.7	3.1
Maturity fears	4.0	8.7	3.6	2.4	5.9	1.7	7.8	2.7	5.0
Interpersonal distrust	4.9	6.7	6.3	7.0	7.0	1.9	5.7	1.9	3.9
Perfectionism	8.2	7.3	6.7	8.6	7.9	7.9	6.3	8.5	3.4
Interoceptive awareness	9.2	13.1	10.6	9.4	11.4	4.5	10.9	4.6	6.0

From Table 2, the general pattern for the subscales of the EDI is for the BN group to have the highest scores, followed by the BED group and then individuals with restrained eating and finally, those who are overweight. An exception is for the Body Dissatisfaction subscale. The BED group generally scored higher than the BN group. The results of the individual studies will be considered individually to examine significant differences between the groups.

Body dissatisfaction has been associated with the eating symptomatology of BN, but has also been found to be common in non-eating disordered women (Garfinkel et al., 1992). In a comparison of individuals with BN and non-eating disordered controls, it was found that body dissatisfaction is a necessary part of BN, but is not exclusive to it. However, it is more marked in women with a high level of weight preoccupation. Women with BN who had previously been overweight and often weighed more at the time of the study reported higher levels of body dissatisfaction (Garfinkel et al., 1992). Further, it has been reported that the majority of adolescents and young females are dissatisfied with their body image, although only a minority are actually overweight (Cooper & Fairburn, 1983).

In a study examining body shape concerns among adolescents, BN (defined by DSM-III-R criteria), AN, subclinical BN, subclinical AN, and non-eating disordered controls were compared. In this study it was demonstrated that individuals with BN had the greatest concerns about their body shape in comparison to adolescents with and without eating psychopathology (Bunnell, Cooper, Hertz, & Shenker, 1992). However, in support of Garfinkel and colleagues (1992), it was found that non-clinical, non-eating disordered

adolescents also reported experiencing concerns about their body shape (Bunnell et al., 1992).

Evidence thus far has established that individuals with BN have greater eating symptomatology in terms of Weight and Shape Concerns than individuals with AN, non-eating disordered controls, and individuals with restrained eating. Further studies are next examined to consider differences between BN and BED.

In one study, BED (defined by DSM-IV criteria) and BN (defined by DSM-III-R criteria) were examined using the EDI (Raymond et al., 1995). Subscales of the EDI indicated significantly higher rates of symptomatology in the BN group compared with the BED group. The lower Drive for Thinness score for individuals with BED may indicate that they are less anxious about their eating patterns and weight, feel less guilty about being overweight, and are less preoccupied with their eating behaviour than BN individuals. Individuals with BN were significantly higher on Ineffectiveness, Interpersonal Distrust and Interoceptive Awareness. It may be that individuals with BED have a better overall opinion of themselves, are able to perceive internal states more accurately, or are better socially adjusted and are more comfortable in maintaining interpersonal relationships.

The BED group had a higher score on the Body Dissatisfaction subscale than the BN group, however, this may not be accurate or valid (Raymond et al., 1995). This subscale reflects the belief that specific parts of the body associated with shape change or increased "fatness" at puberty are too large, for example, hips, thighs and buttocks (Garner, Olmstead, & Polivy, 1983b). This is common in BN, whereas for many individuals with BED, accurate answers on these items would result in a high score, for example, "my thighs are too large", as

individuals with BED are often overweight. However, an argument could be made that the content of the items in the Body Dissatisfaction subscale imply dissatisfaction irrespective of size. A limitation of this study was that participants were age-matched. Individuals with BED tend to be older than those with BN, therefore, the younger group may not be representative of the BED population. BED participants also had to pay $1000 to participate in a treatment program, whereas the BN group volunteered for a free study. This increases the potential for sampling bias.

As well as examining differences between BED and BN, comparisons have been made between BED and obesity. Molinari and colleagues (1997) compared overweight BN, obese BED and obese non-BED individuals on the EDI. They found that the BN group had scores indicating higher psychopathology in the specific area of eating disorders than the obese BED group. Further, the obese BED group reported higher values than the obese non-BED group. Drive for Thinness, Interoceptive Awareness and Ineffectiveness were all rated significantly more strongly by the BN group. There was no significant difference on the Body Dissatisfaction scale between the three groups. Obese BED women scored similarly to women with BN on the Perfectionism subscale, which suggests some similarities in clinical features between BED and BN.

The EDI was used to make comparisons between BED, BN and obese subjects. Generally, the BN group had scores most indicative of psychopathology, and the obesity group had the least pathological scores, with the BED group in between on the EDI subscales. An exception was the Body Dissatisfaction score, with the BN group scoring lower than the BED and obese

groups (Fichter et al., 1993). However, as noted previously, scores on the Body Dissatisfaction subscale may not indicate higher levels of eating psychopathology in overweight individuals.

Individuals meeting the diagnostic criteria for BED, based on the SCID-I, were examined for eating symptomatology using the EDI. The participants were seeking treatment at a university hospital centre (Barry et al., 2002). Results showed higher scores on the EDI than those reported by Raymond et al. (1995), however, the study did not include a control or comparison group. Further, the participants were treatment seeking, which may indicate that their symptoms were more severe than those non-treatment seeking individuals with BED.

In summary, studies have found that individuals with BN have significantly higher scores on the majority of the subscales of the EDI than individuals with BED. The only exception to this was the subscale Body Dissatisfaction, where studies have either found no difference between these two groups or that the BED group rate significantly higher than the BN group. The BED group rated significantly higher than obese non-BED group on the subscales of the EDI.

4.3 BINGE BEHAVIOUR

It is evident from the literature that eating symptomatology is not directly related to binge behaviour. Therefore, the binge behaviour needs to be considered separately. When examining binge behaviour, it is important to consider both the quantity, that is, the amount eaten, and the quality, that is, the food type eaten. The literature is not directly comparable without conversion, as some results are presented in calories and others in kilojoules.

In BN and BED the amount of food eaten during a binge is defined as "an amount of food that is definitely larger than most people would eat during a similar period of time and under similar circumstances" (DSM-IV; APA, 1994, p. 549). The amount of food or number of calories/kilojoules consumed during a binge has been the focus of a number of investigations. Different methodologies have been implemented to study food consumption. Eating diaries and laboratory studies have been utilised to examine the amount of food eaten during a binge. Both of these methodologies have limitations. For example, for individuals with BN, the recall of the size of a binge meal may be greater than the actual size of the meal when food consumed is in excess of 1000 kilocalories (kcal) (Hadigan, LaChaussee, Walsh, & Kissileff, 1992). Therefore, studies that utilise 24 hour recall may overestimate the amount of food eaten when the total is large. Nevertheless, useful information has been obtained from these studies.

4.3.1 Quantity of the Binge

One way of examining bingeing behaviour is to consider the amount of food or number of calories/kilojoules consumed. It has been found that the amount of calories consumed during a binge varies greatly in individuals with BN with a mean of 1348.5 kcal, ranging from 100 to 6600 kcal (Gleaves, Williamson, & Barker, 1993). This indicates that for individuals with BN, sometimes only a relatively small amount of food needs to be consumed for them to consider it a binge. This raises questions regarding the DSM-IV (APA, 1994) definition of binge eating consisting of a large amount of food. In support of this, a review of the literature by Wilson (1992) concluded that there was little

empirical evidence to suggest that a binge eating episode is always large, and no widely accepted amount of food required to be considered a binge.

The amount food eaten by normal weight BN and non-eating disordered controls was measured when vomiting was prevented (Rosen, Leitenberg, Fondacaro, Gross, & Wilmuth, 1985). It was found that the BN group consumed less than the control group, indicating that they restricted their intake. The authors concluded that due to the artificial constraints placed on the individuals in the form of prevention of vomiting, no useful information about typical binge size could be obtained. It may be more valid to examine the amount of food consumed during a binge in a natural environment.

Eating diaries were used to examine the amount of food eaten during a binge by individuals with BN. Results showed that during a binge eating episode the mean number of calories consumed was 1459, compared with 321 calories for a nonbinge eating episode. There was again a large variation in the amount of food consumed, with a standard deviation of 1172 calories for the binge eating episode. Many of the binge eating episodes contained food that had a calorie total of over 2,000, which has been defined as an objective binge by some authors (Rosen, Leitenberg, Fisher, & Khazam, 1986).

When considering self-report studies, it has been noted that when "forbidden" food is eaten, the perception of overeating or binge eating was affected in individuals with BN (Gleaves et al., 1993). Individuals tended to over-report the amount eaten when these types of foods were consumed. A previous study also demonstrated that as caloric intake increased, individuals with BN and individuals with compulsive binge eating reported overeating at a

much higher rate than did obese non-binge eating and non-eating disordered controls (Williamson, Gleaves, & Lawson, 1991).

In a study comparing the self-reported quantity of food consumed during binge eating episodes between BN and BED, no significant difference in the mean number of kilocalories was found (Fitzgibbon & Blackman, 2000). For the BED group the mean number of kilocalories was 2306.5, compared to 2799.0 for the BN group. Again, the high standard deviations (1205.2 for the BED group and 1536.9 for the BN group) indicated a large variation within the groups.

In a laboratory-based study, the binge eating and purging behaviours of individuals with BN were examined. This took place in a human feeding laboratory that allowed participants to select food from a vending machine that recorded the food items selected and time that they were taken. Participants in the study were required to vomit into a bucket, so that stomach content could be analysed. The mean amount of food eaten during a binge eating episode was 2,131 kcal, and the mean amount vomited was 979 kcal. It was found that there was a ceiling on the number of calories that individuals with BN retain when they engage in binge eating and vomiting, with a ceiling of about 1,200 kcal retained (Kaye, Weltzin, Hsu, McConaha, & Bolton, 1993). Consistent with other studies, large variations between individuals were reported.

Three laboratory studies have compared the amount of food eaten per day by individuals with BN and non-eating disordered controls (Hetherington, Altemus, Nelson, Bernat, & Gold, 1994; Kaye et al., 1993; Weltzin, Hsu, Pollice, & Kaye, 1991). Similar results were reported for the non-eating disordered control groups, with one study reporting 1,924kcal (Hetherington et al., 1994) and another 1,845kcal (Weltzin et al., 1991). The third study asked individuals

to replicate a binge eating day and a non-binge eating day. They also confirmed similar quantities for the non-eating disordered control group with 1,844kcal being consumed on the binge eating day and 1,832 on the non-binge eating day (Kaye et al., 1993). However, there was a large discrepancy between the results reported for the BN groups. In one study the amount eaten per day was 4,446kcal (Weltzin et al., 1991) compared with 10,034kcal (Hetherington et al., 1994). On a non-binge eating day only 2,335kcal were consumed compared to 7,101kcal on a binge eating day (Kaye et al., 1993). Other studies have reported large standard deviations in the calories consumed by individuals with BN when engaging in binge eating (e.g., Fitzgibbon & Blackman, 2000). This may account for the discrepancies reported in these studies.

The nutrient intake of 50 women with BN (defined by DSM-IV diagnostic criteria) was examined to compare binge episodes with non-binge eating episodes (Gendall, Sullivan, Joyce, Carter, & Bulik, 1997). Information was collected through dietary recording over a 14 day period. No significant difference was reported between the mean quantity of food consumed during a binge or non-binge day. The mean quantity of food eaten during a non-binge day was 5,701 kJ (1,361.4 kcal equivalent), compared to a binge day where this increased to 6,680 kJ (1,595.2 kcal equivalent). This was less than has been reported in laboratory studies. However, a large standard deviation was found, especially for the binge day (7,483kJ, 1,786.9 kcal equivalent). This indicates that although the mean levels of food consumption were lower, there were some individuals who ate far less, and others who ate far more. A limitation of this study was that it did not include a control group.

A comparison between obese BED and obese non-BED individuals in the amount of food eaten during a normal meal and a binge meal was made in a laboratory setting by Yanovski et al. (1992). The instructions were to eat as much as they would in a normal meal or to eat as much as they could for the binge meal. It was demonstrated that the obese BED group ate more than the obese non-BED group during both the normal meal (2,343kcal versus 1,640kcal) and the binge meal (2,936kcal versus 2,017kcal; Yanovski et al., 1992). In another study comparing the same groups, participants were exposed to either a single-item test meal of ice cream or to a multi-item buffet style meal. The participants were similarly instructed to eat as much as they could. In support of the above finding, it was reported that the obese BED group ate significantly more than the obese non-BED group during the multi-item meal (1,514.7kcal versus 1,115.2 kcal). However, in contrast to the above finding, there was no significant difference between the amount of food eaten in the two groups during the single-item test meal (745.5kcal versus 781.0kcal; Goldfein, Walsh, LaChaussee, Kissileff, & Devlin , 1993).

Rossiter, Agras, Telch, and Bruce (1992) examined the amount of food consumed during a subjective binge eating episode in a non-purging BN group. This group would be comparable to a BED group, due to the diagnosis being made using DSM-III-R criteria, and it has been argued that there is much similarity between this version of non-purging BN and BED (Castonguay et al., 1995). The results indicated that, on average, 600 kcal were consumed during a subjective binge eating episode. Relative to other studies, this is a small calorie intake, even for a subjective binge. Unfortunately, no comparison group was

examined, so there was no way of determining to what extent the results deviated from those obtainable from a non-eating disordered group.

It is possible that overweight and obese individuals tend to underestimate the frequency of binge eating episodes compared with underweight individuals. They consume a greater amount of food during binge episodes, consume more fat in binge episodes and in between times, and have a genetic tendency to be overweight or obese (Kinzl et al., 1999). Two studies made comparisons between individuals with BED and a weight matched non-binge eating group (Geliebter et al., 2001; Greeno, Wing, & Marcus, 1999). Geliebter et al. (2001) required the two groups to consume a test-meal until feeling extremely full. They reported that the BED group consumed significantly more of the meal than the non-binge eating group (1,032g versus 737g). This result is consistent with other studies which have shown that food intake is larger in BED participants than non-eating disordered controls (Goldfein et al., 1993; Yanovski et al., 1992). In Greeno and colleagues (1999) study, participants were asked to report the minimum amounts of food that would be considered a binge. No significant difference was found between the two groups, indicating that women with BED did not have more restrictive dietary standards than overweight women. However, the BED group did report larger amounts of food in their typical and largest ever servings than the non-BED group.

In summary, it appears that there is a large variation in the amount of food consumed during a binge episode for both BN and BED individuals. No significant differences have been found between the amounts of food eaten by these two groups when engaging in binge eating. Obese BED individuals have been found to consume more food than obese non-BED individuals for both

normal meals and binge eating episodes. Further, individuals with BN have been found to consume more than non-eating disordered individuals. An exception to this is when individuals with BN are prevented from vomiting. In these situations, the amount consumed by individuals with BN was less than the non-eating disordered control group.

4.3.2 Quality of the Binge

An alternative means of examining binge behaviour is to consider the content of the binge in terms of food type consumed. In a study examining the food consumed by individuals with BN when binge eating was compared to a non-binge meal, differences were reported. The binge meal was characterised by food consisting of lower protein and higher fat levels than a non-binge meal (Gendall et al., 1997).

A number of studies have reported that when an individual with BN is not engaging in binge eating, food choice consists of a higher proportion of healthy items (Hadigan et al., 1992; Van der Ster Wallin, Norring, & Holmgren, 1994). In comparison, typical food consumed during a binge eating episode comprises high carbohydrate items such as cake, ice cream, bread and potato chips (Van der Ster Wallin et al., 1994)

In a comparison of individuals with BN and BED, no differences were found between binge quantity, however, differences were reported in the binge quality. For individuals with BN, the binge was higher in carbohydrates and sugars than individuals with BED (Fitzgibbon & Blackman, 2000). These types of food being consumed by people with BN have been reported elsewhere. For example, the food eaten by individuals with BN when binge eating has been

found to consist mostly of snack and dessert foods (Rosen, Leitenberg, Gross, & Willmuth, 1985). In comparison, the binges of individuals with BED tended to resemble foods eaten at a meal (Fitzgibbon & Blackman, 2000). The difference in food consumed during a binge implies different antecedents and triggers for a binge episode. A limitation of this study was that it relied on self-report data. Further, the participants were a treatment seeking group, so the results may not be generalisable all individuals with BED.

A laboratory based study examined food selection in BN, BED, non-BED and normal weight participants. Each group was given a multiple item meal, and were instructed to binge eat. Food choices were recorded every 10 seconds throughout the meal. (Cooke, Guss, Kissileff, Devlin, & Walsh, 1997). Individuals with BED differed to those with BN in their food selection. Those with BED had eating patterns that were similar to non-eating disordered individuals. Both the BED and obese non-BED groups had high levels of meat consumption in the early stage of the meal that decreased later in the meal and dessert consumption was low in the early stage of the meal and increased in the concluding stages of the meal. Vegetable and carbohydrate consumption was consistent throughout the meal. For individuals with BN, in comparison to normal weight non-eating disordered controls, more time was spent eating dessert and snack foods, typically earlier in the meal. Meat consumption was distributed evenly across the meal. Cooke and colleagues concluded that binge eating episodes for individuals with BN and BED are qualitatively different.

In summary, a binge meal for individuals with BN consists of more fat and less protein than a non-binge meal. A non-binge meal is usually composed of healthy foods, whereas a binge meal consists of "forbidden" snack foods.

When comparing binge meals in BN and BED, individuals with BN consume more carbohydrates and sugars than individuals with BED. Further, a binge meal for individuals with BED more closely resembles a normal meal.

4.3.3 Non-binge Eating Behaviour

Differences between groups may also be evident in eating behaviour not associated with bingeing. The majority of studies that have examined non-binge eating behaviour have done so to provide a comparison for binge eating behaviour. As previously mentioned, for individuals with BN, the amount of food consumed during a non-binge eating episode was found to contain significantly fewer calories than that of a binge eating episode (Kaye et al., 1993; Rosen et al., 1986). However, when the total amount of food per day was examined, no difference was found between non-binge eating and binge eating days (Gendall et al., 1997).

For obese individuals with BED, it was found that less food was consumed during a normal meal compared to a binge eating episode. Interestingly, the BED group ate significantly more than the obese non-BED group for the normal meal (Yanovski & Sebring, 1994). However, another study did not report differences in the amount of food consumed during a single-item test meal for obese BED and obese non-BED individuals (Goldfein et al., 1993). The different methodologies may account for these variations. Yanovski and Sebring (1994) required participants to record food intake, whereas the Goldfein et al. (1993) study required participants to eat a test meal.

A comparison of individuals with BN, restrained, and unrestrained eating was made during consumption of a midday meal (Bourne, Bryant, Griffiths,

Touyz, & Beumont, 1998). Behaviours such as picking at the food, abnormal eating rates and a preference for low calorie foods were examined. It was reported that the BN group demonstrated a significantly greater degree of pathological eating behaviour than unrestrained eaters. However, restrained eaters were not significantly different from either the unrestrained or BN group. The similarity between the BN and restrained eating groups was hypothesised to occur due to the comparable cognitions regarding control over food.

When vomiting was prevented, it was reported that individuals with BN consumed significantly less than a non-eating disordered control group (Rosen, Leitenberg, Fondacaro et al., 1985). The BN group ate more foods that were considered healthier (e.g., vegetables and salad) than foods that were considered unhealthy (e.g., lollies), but in both instances, this was significantly lower than the amount ingested by the control group.

In summary, there is limited information on the food quantity and quality of non-binge eating for individuals with BN and BED. In spite of this, there does appear to be some evidence that non-binge eating behaviour in individuals with BN and BED differs from eating behaviour in individuals without these disorders. A high level of dietary restraint is usually associated with individuals with BN and, therefore, it would be expected that when they were not engaging in binge eating, the amount of food would be lower, and the food selection would consist of foods that are considered healthy. Individuals with BED do not typically have high levels of dietary restraint. Therefore, the amount of food consumed during a non-binge meal has been found to be equal to, or more than that of non-BED individuals. Food selection for individuals with BED appears

to be similar for a non-binge meal as a binge meal. The quantity appears to be a more clearly defining feature.

4.4 SUMMARY

In terms of eating symptomatology, there is evidence to suggest that individuals with BN exhibit the most severe symptoms. When divided into purging and non-purging types, the purging type has been found to have more elevated symptomatology. Individuals with BED have less eating symptomatology than individuals with BN, however, they have significantly greater levels of symptomatology than individuals with restrained eating and overweight non-BED individuals.

When comparing BN and BED, the main difference in eating symptomatology is that individuals with BN have significantly higher levels of restraint than those with BED. Individuals with BED have similar levels of restraint to obese non-BED individuals; however, the BED group has more severe symptomatology in regards to Weight, Shape and Eating Concerns.

When individuals with BN were divided into subjective and objective binge eating groups, no difference is found in eating symptomatology. Similarly, no differences are found in measures of psychopathology when comparing individuals with BED who consume small quantities of food versus large quantities. This similarity in symptomatology raises questions regarding the validity of DSM-IV diagnostic criteria, which specify that the binge episode is required to be larger than a normal meal.

In terms of binge eating behaviour, there does not appear to be any difference between the amount of food consumed during a binge eating episode

for individuals with BN and BED. There is, however, a large variation in the amount of food consumed in a binge eating episode. This large variation in binge size was consistently reported across numerous studies.

Another interesting finding is that the frequency of binge eating and purging in individuals with BN was not related to the level of eating symptomatology. This further questions the validity of DSM-IV diagnostic criteria relating to the frequency of these behaviours.

Differences were reported in the type of food consumed during a binge eating episode for individuals with BN and BED. Those with BN tend to eat snack foods, that they would otherwise avoid. In contrast, a binge episode for individuals with BED consists of food similar in content to a normal meal. This indicates that there are qualitative differences in binge eating episodes between these two groups.

Non-binge eating for individuals with BN appears to consist of more healthy foods and lower quantities than a binge episode. For those with BED a non-binge meal consists of similar foods to a binge episode, but less food is consumed.

CHAPTER 5

PSYCHOPHYSIOLOGICAL RESPONSES TO BINGEING

5.1 INTRODUCTION

Psychophysiological reactions can be divided into subjective and objective measures. A subjective measure is a physiological change that the individual perceives in his or her body; an objective measure is a physiological change within the body that is objectively measurable. Subjective psychophysiological information has been included in some studies examining physical sensations experienced in relation to binge eating. These studies have utilised rating scales to examine physical sensations that are experienced at different stages across a binge eating episode (Abraham & Beumont, 1982; Arnow, Kenardy, & Agras, 1992; Greeno, Wing, & Shiffman, 2000; Hsu, 1990; Karhunen, Lappalainen, Tammela, Turpeinen, & Uusitupa, 1997; Karhunen et al., 2000; Stickney, Miltenberger, & Wolff, 1999). Further, subjective responses taken together with objective responses, provide a more thorough view of the pattern of response (Williamson, Goreczeny, Davis, Ruggiero, & McKenzie, 1988).

Psychophysiological recordings provide an objective measure of emotional responses in people who engage in binge eating. The most commonly recorded indices of autonomic arousal used have been heart rate (HR), blood pressure (BP), electrodermal activity and electroencephalogram (EEG) (Leonard, Pepina, Bond, & Treasure, 1998). There have been a variety of different methodologies used in an attempt to elicit these physiological responses. These include exposure to food stimuli (e.g., Karhunen et al., 1997, 2000; Voegele & Florin, 1997), requesting participants to eat a test meal (e.g., Leonard et al., 1998; Williamson et al., 1988), and inducing emotional states such as stress with the

premise that binge eating occurs in response to a state of emotional stress (e.g., Cattanach, Malley, & Rodin, 1988; Tuschen-Caffier & Voegele, 1999).

5.2 SUBJECTIVE PSYCHOPHYSIOLOGICAL RESPONSES

Individuals who engage in binge eating have reported experiencing a range of subjective physical reactions. Self-reported physical sensations have been measured at different stages of a binge eating episode (Abraham & Beumont, 1982; Arnow et al., 1992; Hsu, 1990). These measures have usually been incorporated into studies examining emotional responses to binge eating. Subjective responses have also been considered in studies examining physiological responses in eating disordered participants (Karhunen et al., 1997).

Hsu (1990) conducted an examination of emotional and physical sensations that occur before a binge, during the first part of a binge and when feeling full. When considering the physical sensations, tension (which was worded as anxious/nervous/tense) was the sensation most strongly endorsed at each stage. However, the number of individuals selecting this decreased from before the binge to the first part of the binge, and again to feeling full, suggesting a reduction in tension. To corroborate this finding, tension was the most frequently cited precipitant to a binge episode in a study of individuals with BN (Abraham & Beumont, 1982).

The sensation of hunger was reported by several participants before the binge (Abraham & Beumont, 1982; Hsu.1990; Stickney et al., 1999), and was found to decrease across a binge eating episode (Hsu, 1990). This finding has been consistent for individuals with BN and for a broader category of individuals who engage in binge eating.

The physical sensations experienced during a binge eating episode were examined in a study focusing on obese individuals who engaged in binge eating (Arnow et al., 1992). These participants were selected by means of clinical interview based on the DSM-III-R diagnostic criteria for BN with the exception that they did not engage in purging behaviour. As already established, DSM-III-R diagnosed non-purging BN and BED are considered to be similar (Castonguay et al., 1995). A semistructured interview elicited information regarding physical sensations experienced before, during and after a binge eating episode. The physical sensations measured were hunger, pleasure, fullness, and tension, and participants were able to specify other sensations or to indicate if none were experienced.

Participants reported that prior to a binge, the most common physical sensation was hunger, with 47 percent of participants endorsing this. In addition, 47 percent of participants indicated that they were aware of no physical sensations at that time. During the binge, the physical sensation most strongly endorsed, with 42 percent of participants choosing the response, was a pleasant sensation. Again, no physical sensations were experienced by a large percentage of participants (37%). Further, 16 percent of participants reported that during the binge they experienced feelings of fullness. After the binge, feelings of fullness were by far the most commonly reported sensation (84%) with no sensation being the only other report (16%; Arnow et al., 1992). No participant endorsed the sensation of tension at any time before, during or after the binge. Given that binge eating has been strongly associated with experiences of anxiety, it would be hypothesised that the individual would also experience some level of tension associated with this. Therefore, it is surprising that tension was not endorsed at

any stage. This may have been due to participants misunderstanding the meaning of the word tension in the context of the study. The other sensations related to the experience of hunger and satiety.

A comparison of overweight individuals with BED and overweight non-BED individuals demonstrated that different patterns of antecedents for binge eating exist when examining emotional and cognitive factors (Greeno et al., 2000). However, when only examining subjective physical sensations, a craving for sweets predicted binge eating in both the overweight BED and overweight non-BED individuals. There were no differences between the two groups on ratings of hunger prior to eating.

Another study that compared overweight individuals with BED and overweight non-BED individuals used food exposure and eating of a meal to examine differences between the two groups (Karhunen et al., 1997). It was reported that individuals with BED experienced a greater desire to eat when exposed to food compared with non-BED individuals. However, there were no differences in reported levels of hunger between the two groups. This is consistent with the finding by Greeno et al. (2000) reported above. It was hypothesised that this is characteristic of the diagnosis of BED, in that individuals report that they often eat when they are not feeling physically hungry (Karhunen et al., 1997).

Another study, only utilising food exposure, was completed comparing obese BED, obese non-BED, and normal weight non-eating disordered women (Karhunen et al., 2000). In this study, no differences were reported between groups in the level of hunger and desire to eat.

Karhunen and colleagues' two studies differed slightly in the methodology employed. In the 1997 study, participants were told that they would soon be eating breakfast while they prepared the meal, whereas in the 2000 study participants were not informed that eating would be a part of the experiment, but that they could eat after the experiment was completed. This difference in methodology may have accounted for the different findings.

In summary, studies examining individuals with BN have consistently found tension and hunger to be strong precipitants to a binge episode, whereas tension has not been endorsed at any stage of a binge in individuals with BED. These differences in ratings of the sensation of tension may have been due to the clearer definition given by the researchers examining BN. The sensation of hunger was a common precipitant in both BN and BED, and this was found to decrease across a binge eating episode in both groups. For the BED group the sensation of hunger may be described more specifically as a greater desire to eat. During the binge, individuals with BED endorsed sensations of pleasure, whereas pleasure was not reported in individuals with BN.

5.3 OBJECTIVE PSYCHOPHYSIOLOGICAL RESPONSES

There are many variations in methodology when examining objective psychophysiology. The measures that have been utilised differ across studies, making it difficult to make comparisons between them. However increases in arousal is generally interpreted to reflect a stressful or negative response rather than excitement. Furthermore, studies have differed in the objective psychophysiological responses that have been measured. Due to these variations in methodology, each will be examined separately.

5.3.1 Psychophysiological Responses to Food Exposure

Taking a variety of forms, food exposure methodologies have involved either the direct exposure of the participant to food or to slides depicting food (Laberg, Wilson, Eldredge, & Nordby, 1991; Overduin, Jansen, & Eilkes, 1997). Food exposure has been used to elicit psychophysiological responses in non-eating disordered groups (Drobes et al., 2001; Overduin & Jansen, 1996; Wilson & Mercer, 1990), individuals with restrained eating (Overduin et al., 1997), and also in those who engage in binge eating (Karhunen et al., 1997, 2000; Neudeck, Florin, & Tuschen-Caffier, 2001; Voegele & Florin, 1997).

Studies have differed in the type and amount of food that has been used in food exposure. This has ranged from a plate of four chocolate chip cookies (Wilson & Mercer, 1990), to participants selecting food from a list of sweet and savory snacks that they liked (Voegele & Florin, 1997). Further, in some investigations participants were offered the food to eat, and in others this was not done.

Individuals with BN, based on DSM-IV diagnostic criteria, and a non-eating disordered control group were exposed to food in a study by Neudeck et al. (2001). The BN group was divided in half, with one half being exposed to high caloric food and the other low caloric food; a control group was only exposed to high caloric food. The exposure in the experimental groups was repeated over two days. Results from this study established that the BN group exposed to high caloric food responded with increased physiological stress, as measured by cortisol levels, on the first day but not on the second when compared with the group exposed to low caloric food. The authors explained this finding in terms of habituation and expectations for the second session

(Neudeck et al., 2001). It may be that the BN participants regarded high caloric food as both appealing, in terms of wanting to binge eat, as well as abhorrent, in terms of fear of weight gain and a violation of stringent food rules. This would result in the increase in cortisol levels observed in food exposure, and the lack of increase when their expectation was that they would not engage in binge eating when seeing the food during the second exposure.

In a study by Laberg et al. (1991), slides illustrating food were found to cause an initial deceleration in heart rate when shown to individuals with BN and individuals with restrained eating. Although there were no significant differences between the two groups, following the induction of a negative mood, the BN group showed a significantly greater deceleration in heart rate when viewing the slides. The brief deceleration of heart rate in response to food may be related to attention. The BN group demonstrated significantly enhanced attention to food pictures, but only while experiencing a negative mood state. This indicated that people with BN find food more inviting when they are distressed. It was hypothesised that this increased attention to food when in a negative mood state may facilitate binge eating (Laberg et al., 1991). A limitation of this study, however, is that the authors did not counterbalance exposure to the experimental stimuli. The authors concluded that it was questionable whether the findings were due to the negative mood induction procedure or simply due to repeated exposure. However, there were differences for the BN group, indicating that they responded differently than did individuals with restrained eating.

In a study by Karhunen et al. (1997) physiological cephalic phase responses (e.g., the release of insulin) were recorded in two groups, obese binge

eating and obese non-binge eating, in response to exposure to food. It is thought that these responses may be subjectively experienced as cravings or hunger, and that this in turn would result in a binge eating episode (Neudeck et al., 2001). No significant physiological cephalic phase differences were found between the two groups. However, binge eating behaviour usually occurs in response to specific psychological states, such as those reported by Arnow and colleagues (1992). Therefore, there may be differences in real-life situations (Karhunen et al., 1997).

In an examination of cerebral blood flow in response to food exposure by Karhunen et al. (2000), obese BED, obese non-BED and normal weight non-eating disordered control women were compared. It was demonstrated that in response to food exposure different hemispheric blood flow was elicited in the obese BED group compared to the obese non-BED and normal weight groups. This suggests that different areas of the brain may be involved in binge eating in individuals with BED, and that food elicits different emotional responses in these groups. This is reflected in the differential pattern of response.

Individuals who engage in binge eating were compared with individuals with restrained eating, and non-eating disordered controls who were either deprived or not deprived of food before the task (Drobes et al., 2001). No differences were found between the non-deprived and restrained eating individuals. However, both the binge eating group and deprived groups' psychophysiological responses were associated with a more aversive response to food cues.

Voegele and Florin (1997) compared individuals who currently experienced binge attacks with individuals for whom binge eating was practically unknown. At baseline, no differences in psychophysiological levels were found

between individuals who engaged in binge eating and those who did not. Individuals who engaged in binge eating responded with elevated systolic blood pressure (SBP) levels over the 20-minute trial of food exposure, whereas non binge eating individuals declined in SBP. The authors concluded that the decrease SBP in the non-binge eating individuals may have been due to habituation to the presentation of food cues. The increase in SBP in the binge eating group indicated an increase in sympathetic arousal.

It has been postulated that electrodermal activity measurements may be less sensitive to artefacts than blood pressure and HR (Leonard et al., 1998). When exposed to food, it was found that the binge eating group responded with high initial skin conductance levels (SCL) and demonstrated a subsequent decline. In comparison, there was no clear pattern of response in the non-binge eating group. This increase in initial SCL when exposed to food indicated increased sympathetic arousal (Voegele & Florin, 1997). An experiment using university students found that when offered a plate of cookies, individuals with higher scores on the Eating Attitudes Test (EAT) showed an increase in sympathetic response as measured by electrodermal activity (Wilson & Mercer, 1990). The EAT identifies behaviours associated with AN, but is not specific enough to diagnose eating disorders.

Overduin et al. (1997) made a comparison of psychophysiological responses in restrained and unrestrained eaters when exposed to slides depicting food and their own bodies. No differences between groups were found. In support of this finding, Drobes and associates (2001) also found no difference between individuals with restrained eating and non-eating disordered (and non-deprived) individuals when exposed to slides of food.

Non-eating disordered women were assigned to two conditions, fasting and non-fasting, and were then exposed to food (Overduin & Jansen, 1996). Psychophysiological recordings were made during the exposure. No differences between the two groups were noted, indicating that food deprivation alone was insufficient for any differences to occur in psychophysiological responding to food. However, in a more recent study of a university population, different measures of psychophysiology were employed. Food exposure utilising slides demonstrated a greater startle response in a food deprived group compared to a non-deprived group (Drobes et al., 2001).

In summary, in response to food exposure studies of individuals with BN, studies have demonstrated that when being provided with high caloric food there is an initial increase in physiological distress which is not evident when low caloric food is presented. Another finding is that when a negative mood is induced there is a decrease in heart rate when exposed to food. This suggests that food may be more appealing when an individual is distressed, however, no differences were found between individuals with BN and restrained eating. More consistent findings have been reported for obese individuals who engage in binge eating. An increase in sympathetic arousal was found when exposed to food. Although differences have been reported, many studies have found no significant results when comparing groups. Furthermore, some differences have been reported between non-eating disordered women when comparing food-deprivation with no deprivation. This implies that current psychological state can affect physiological state regardless of eating psychopathology.

5.3.2 Psychophysiological Responses to Test-Meals

Participants have been required to eat a meal in a laboratory setting, with the meal defined as either a standard meal or a binge meal by the researcher. These meals have been utilised to elicit psychophysiological responses in individuals who engage in binge eating (BN and BED) and a variety of comparison groups, however, the content of a test-meal has varied between studies. Mid-morning snacks have been employed in two studies (Leonard et al., 1998; Williamson et al., 1988). However, the amount of kilojoules (kJ) that participants were required to eat differed between the studies. In the first study, participants were required to eat food consisting of 2600 kJ, comprising a sandwich, potato chips and a non-diet drink (Williamson et al., 1988). In the second study, the participants were only required to eat 1350 kJ, made up of bread, cheese and fruit juice (Leonard et al., 1998). Therefore, there was a large variation in the type and amount of food consumed across studies and the groups that have been studied.

Further inconsistencies in methodology were evident in one study where participants were asked to select food that they liked from a list of sweet and savory food. Initially, food exposure was used to elicit responses, however, subjects could eat the food after the exposure if they chose (Voegele & Florin, 1997). Similarly, Buree, Papageorgis, and Hare (1990) required their participants to select the food that they were to eat. The amount of food consumed in these studies would have varied between participants. Overall, the amount of food participants ate as a test-meal would be considered small, and not representative of a binge.

An earlier study examined the psychophysiological response to a test meal in three groups, BN (based on DSM-III diagnostic criteria), and normal weight and overweight non-eating disordered groups (Williamson, Kelley, Davis, Ruggiero, & Blouin, 1985). The test meal consisted of a hamburger, french fries and a soft drink. Differences were only found between the groups when the most extreme BN participants (defined as those who engaged in binge eating and purging on a daily basis) were examined separately. This group showed some evidence of physiological signs of anxiety after eating. It was suggested by these authors that anxiety relating to BN behaviour may only relate to severe cases, or that the test meal utilised may not have been representative of a binge meal and, therefore, individuals with lower severity of symptoms may not have found the meal anxiety provoking.

Contradictory results have been reported with regard to SCL when using a test meal methodology. If consumption of food in eating disordered individuals caused them to feel increased anxiety, it would be expected that an increase in sympathetic arousal would be observed as a decrease in skin resistance. Studies have found an initial increase in SCL at the commencement of eating that was followed by a decline in SCL for people with both BED (Voegele & Florin, 1997) and BN (Williamson et al., 1988). In contrast, no differences between the BN and normal weight non-eating disordered groups were found in response to skin resistance, indicating that the BN group did not feel any more anxious than the control group in this experimental situation (Williamson et al., 1988).

No differences between groups (BN, AN-BN, restricting AN and non-eating disordered controls) in terms of changes in SCL were observed in one

study, although SCL increased from food exposure to a test meal indicating an increase in arousal (Buree et al., 1990). However, in another study comparing individuals with BN and AN, no changes in SCL were found in the BN group (Leonard et al., 1998). There were changes in arousal for the AN group. Two possible explanations were provided by the authors as to why there were no changes in arousal in the BN group. Firstly, there was only limited access to food and, therefore, this may have been perceived as non-threatening to the BN group. Secondly, individuals with BN engage in compensatory behaviours after they have eaten. Consequently, the anxiety levels related to eating may conceivably be reduced (Leonard et al., 1998).

In a study comparing BN, AN-BN, restricting AN and non-eating disordered controls eating a test meal, heart rate changes were similar for all groups. Heart rate reached its highest level during the first minute of eating. It was significantly higher at this time, indicating that psychophysiological arousal was highest during eating (Buree et al., 1990). In addition to this finding, it was reported that when individuals who engage in binge eating began eating a test-meal, there was a further increase in cardiovascular activity from exposure to food (Voegele & Florin, 1997). However, heart rate levels did not differ significantly between the binge eating group and the control group. When individuals who engage in binge eating commenced eating, there was a concurrent increase in respiration rate. This increase in respiration rate may account for the increase in heart rate and decrease in SCL that were also recorded at the time (Voegele & Florin, 1997).

In summary, studies utilising test meal methodology have primarily focused on BN, with few studies examining BED. Given the large deviation in

the amount consumed during a test meal it is difficult to make comparisons. For the BED group a similar result was found to that of a BN group. However, contradictory findings have been reported in studies of BN. A number of research papers have reported increases, decreases, and no change in SCL when eating a test meal. Therefore, it is difficult to conclude what is occurring for individuals with BN when eating a test meal. The nature of the test-meal methodology has limitations itself. A test-meal would have a different context to a naturalistic binge episode and, therefore, it is difficult to gain understanding into the response of individuals to a binge episode.

5.3.3 Psychophysiological Responses to Stress

It is uncertain whether binge eating in BN occurs due to a response to stress, causing an increased desire to binge eat, and whether this increase is associated with higher psychophysiological reactivity compared to non-eating disordered controls (Tuschen-Caffier & Voegele, 1999). One point of view is that people with BN in general react more emotionally to stressors than non-eating disordered controls. The greater reactivity refers not only to the exaggeration of symptoms, such as a strong urge to eat, but should also include greater increases in negative affect and of physiological signs of emotional activation (Heatherton & Baumeister, 1991).

A study investigating the desire to binge and physiological and emotional reactivity in response to achievement challenge and interpersonal conflict found no differences between individuals with BN and non-eating disordered controls on physiological reactivity (Cattanach et al., 1988). However, the BN group in this study rated themselves as having a greater desire to binge, especially when

confronted with interpersonal stressors. It was concluded that people with BN may have specific ways of coping with stress, but there was no evidence that they are more emotionally reactive to stress.

Interpersonal conflict has been found to be particularly important in triggering a desire to binge. Cardiovascular activity was found to decrease in BN subjects compared to non-eating disordered controls when performing an achievement challenge. In contrast, an increased desire to binge in BN subjects was reported during interpersonal conflict (Tuschen, Voegele, & Kuhnhardt, 1995 in Tuschen-Caffier & Voegele, 1999).

In response to an achievement challenge and interpersonal conflict, there was a substantial increase in SCL, heart rate and respiration rate during the task and then a return to baseline levels at the end of the task. However, there were no significant differences between the BN, restrained eaters, or the non-eating disordered control group (Tuschen-Caffier & Voegele, 1999).

In summary, no differences in psychophysiological responses to stress have been found between BN and non-eating disordered control groups. However, subjective responses have been found to differ between these groups. Therefore, it does appear that stress has different modulating effects on these two groups.

5.4 LIMITATIONS OF PSYCHOPHYSIOLOGICAL METHODOLOGIES

Limitations in using psychophysiological methods to assess the anxiety model have been identified. When using a test meal methodology, it may be difficult to get people with BN to consume foods that they consider to be "forbidden". Persuading individuals with BN to eat the test meal may confound

results. The test situation (emotionally, environmentally) in which a participant eats a test meal would not be the same as when they engage in binge eating. Therefore, it is difficult to extrapolate the physiological response to a test meal and consider it to be similar to the physiological response to binge eating in the naturalistic setting (Williamson et al., 1988).

A test meal may not be representative of a binge meal. Additionally, an individual with BN may be anticipating vomiting after the test-meal experiment has been completed, and this may reduce any anxiety associated with consumption (Leonard et al., 1998).

There is a need to integrate other forms of assessment with psychophysiological methodologies, such as subjective measures (Williamson et al., 1988). Psychophysiological measurements are more difficult to obtain and interpret because of physical differences between the groups, for example, weight differences (Buree et al., 1990). Further, individual and situational variables have been found to cause variability in psychophysiological data (Williamson et al., 1988).

In summary, a test-meal does not constitute a binge and, therefore, the physiological arousal recorded cannot be assumed to be representative of that experienced by individuals with BN or BED when they do binge. Given the difficulties in measuring physiological responses to individuals when eating, and that exposure to food does not appear to elicit an eating response, an alternative methodology may be to utilise imagery to elicit psychophysiological responses. This would eliminate a number of limitations, and will be discussed later in more detail.

5.5 SUMMARY

The observed pattern of results indicates that individuals who binge eat respond with greater subjective and physiological arousal to binge cues than non-eating disordered controls (Voegele & Florin, 1997). Exposure to food cues and eating cause a range of physiological and subjective changes to occur. Further understanding of the biophysiological basis of binge eating will help to refine treatment approaches (Voegele & Florin, 1997).

The measurement of the psychophysiological changes that occur during a binge episode presents methodological problems. To measure bodily responses while the person is engaging in the behaviour would be unethical and logistically difficult. Previous research has provided evidence that guided imagery can be utilised to assess the underlying psychophysiological mechanisms for specific clinical behaviours.

CHAPTER 6

EMOTIONAL RESPONSES TO BINGEING

6.1 INTRODUCTION

Uncontrolled eating has been postulated to be a means of modulating dysphoric and fluctuating mood states. Negative mood is a well-established precipitant of binge eating in individuals with BN (Kaye, Gwirtsman, George, Weiss, & Jimerson, 1986; Lingswiler et al., 1989; Stickney et al., 1999). For example, normal weight individuals with BN experience significantly more dysphoric and variable moods than do non-eating disordered control groups (Johnson & Larson, 1982). There is also evidence to suggest that obese individuals with BED binge eat in response to negative emotions (Arnow et al., 1992).

For individuals with BN, it is thought that binge eating provides relief from negative emotions such as sadness, anxiety, or anger. It has been reported that binge eating serves a negative reinforcement function in many cases by providing relief from aversive antecedent conditions (Stickney et al., 1999), and that bingeing and vomiting serve the function of reducing awareness of negative, intolerable cognitions and emotions (Pitts & Waller, 1993; Waller & Matoba, 1999).

When examining binge eating in individuals with BED, there has been evidence to suggest that antecedents of a binge eating episode are similar to those for BN, that is, negative mood, anxiety and anger (Arnow et al., 1992; Greeno et al., 2000; Hsu, 1990). However, from the limited studies that have examined changes in emotion across a binge eating episode in BED, the findings to date have indicated that the emotions during and following a binge are different to those reported by individuals with BN (Arnow et al., 1992; Hsu, 1990; Mitchell

et al., 1999). This suggests that the function of binge eating in these two groups may serve a different purpose.

The link between eating and emotion in obese individuals has also been examined in the literature. Studies have compared obese BED individuals with obese non-BED individuals (e.g., Kenardy, Arnow, & Agras, 1996), as well as examining obese individuals in contrast to normal weight individuals (e.g., Geliebter & Aversa, 2003). Studies have demonstrated some evidence that obese individuals are more likely to engage in eating in response to negative emotional states (e.g., Lowe & Fisher, 1983). However, when obese individuals are divided into those who engage in binge eating and those who do not, the binge eating group are more likely to engage in eating in response to negative emotional states (e.g., Kenardy et al., 1996).

6.2 DIFFERENCES IN EMOTIONAL RESPONSE IN BN AND BED

The emotional responses of individuals with BN and BED have been examined in general situations, as well as in response to normal eating and binge eating situations. The majority of the studies have focused on people who suffer from either BN or BED. However, a few studies have tried to differentiate the emotional responses between people with BN and BED.

When examining a typical psychological state in women with BN in comparison to non-eating disordered controls, it was found that there were significant differences between these two groups (Johnson & Larson, 1982). The women in the study were required to provide self-reports at 40-50 random moments in their lives. It was reported that on six of the eight mood items, the BN group rated these items significantly more negatively than the non-eating

disordered controls. The BN group felt significantly sadder, lonelier, weaker, more irritable, passive and constrained than the non-eating disordered control group. There was also a greater variation in mood for the BN group.

The emotional responses for obese women with BED were reported to be considerably more negative than obese women without BED. The BED women also experienced lower levels of eating control and more food cravings in comparison with obese women without BED (Greeno et al., 2000).

Two studies examined differences between BN and BED in emotional responses to eating situations (Lingswiler et al., 1989; Mitchell et al., 1999). The first study was a comparison between women with BN, women who only engaged in binge eating without purging or fasting behaviours (analogous to a BED group), and non-eating disordered controls (Lingswiler et al., 1989). For the BN group, stress, preoccupation with food and negative mood together precipitated binge eating. The BN group had significantly greater negative mood prior to the binge than did the BED and control groups. However, it was found that both the BN and BED groups reported experiencing significantly greater negative moods than the control group experienced prior to all their eating episodes. The authors suggested that their results indicated either that negative mood states precipitate eating in general for eating disordered populations or that negative mood states be more characteristic of these populations independent of food and eating. Lingswiler et al. (1989) concluded that for sufferers of BN it seems likely that negative mood interacts with stress to increase preoccupation with food. When preoccupied with food, self control attempts are more likely to fail and, at this point, dichotomous cognitions produce the binge. However, for BED the mechanisms are less clear.

Mitchell et al. (1999) also studied the hedonics of binge eating in BN and BED. Although the scale that they used had not been empirically validated, they found some interesting differences between the two groups. The questionnaire assessed several aspects of binge eating using Likert scales. Items were included to examine potential sources of distress associated with binge eating, as well as to assess the degree to which respondents endorsed pleasurable experiences associated with binge eating. With regard to the distress associated with bingeing, there were no significant differences found between the two groups. This finding, which is in contrast to that of Lingswiler et al. (1989), may have been due to the differences in methodologies between the two studies; the study by Mitchell et al. (1999) administered a self-report questionnaire to examine antecedents to a binge, whereas Lingswiler et al. (1989) required participants to record emotional antecedents after each eating episode for a one-week period. By measuring the emotional responses after an eating episode, and over a length of time, the information was able to better differentiate between the two groups. In comparison, Mitchell et al. (1999) considered binge eating in general, and this may have diluted the responses. Further, the Lingswiler study included a non-eating disordered control group to allow for additional comparisons.

Mitchell et al. (1999) did find some differences between the BN and BED groups. There was a more positive valence for binge eating in subjects with BED. Also, the BED subjects reported feeling significantly more relaxed, and enjoyed the taste, smell and texture of the food more than the BN group. Therefore, individuals with BED appear to report more positive emotions in relation to binge eating than individuals with BN, when examining binge eating in general.

Differences in emotional response were reported between obese BED and obese non-BED individuals (Kenardy et al., 1996). The obese BED group was found to be less able to cope with negative emotional distress, and appeared to have a lower tolerance level for negative emotions than the obese non-BED group. In another study, eating in response to negative emotional state was only reported in the obese BED group, and not in the obese non-BED group (Eldredge & Agras, 1996). This provides further support to the finding of Kenardy and colleagues (1996) suggesting that eating in an attempt to reduce negative emotional states is a feature of BED, but not a feature of obesity.

It appears that overall, emotional responding in individuals with BN and BED is more negative than non-eating disordered controls. Additionally, negative mood is associated with eating for both BN and BED sufferers. However, individuals with BED have reported some positive emotions in relation to binge eating. This indicates that mood is not stable over the course of binge eating and fluctuates within a short period of time. When examining mood in association with binge eating, differences between BN and BED have been reported that may be related to different motivations for engaging in the behaviour. The response to negative emotions appears to differ between obese individuals with and without BED.

6.3 MOTIVATIONS FOR BINGE EATING

When examining motivation for binge eating behaviour, studies investigating individuals with BN have focused on motivation in terms of the binge-purge cycle. However, for individuals with BED, there is no compensatory behaviour. Due to this difference, it may be hypothesised that the

motivations for the behaviour differ for the two groups. Studies examining motivations for binge eating have concentrated on these two groups separately, with no direct comparisons between the two groups being conducted to date.

A study comparing recovered and non-recovered women who have had or have BN examined factors that perpetuated the disorder (Rossotto, Rorty-Greenfield, & Yager, 1996). Each group described a sense of addiction, use of purging as a method of weight control or weight loss, and pervasive negative affect. None of the recovered women spontaneously mentioned any positive factors of the disorder. Interestingly, nine of the 40 non-recovered women mentioned positive factors perpetuating their disorder, in comparison to none of the 40 recovered women. These included a sense of power, control, escape, euphoria and bliss. Although not directly related, the non-recovered subjects' response was one of strong conviction that they were indeed benefiting from the disorder. Rossotto et al. (1996) concluded that these positive factors would contribute to difficulty in relinquishing the behaviour.

When examining binge eating in the obese, there is a psychiatric status difference between obese individuals who engage in binge eating and their nonbinge eating obese counterparts (Costanzo, Musante, Friedman, Kern, & Tomlinson, 1999). The reasons for engaging in binge eating were reported to be that men and women were more likely to binge eat if they failed on a diet and experienced higher levels of depression (Costanzo et al., 1999). Diet failure was a more prominent predictor for women, with binge eating also being related to low self-esteem. Women were also more likely to binge eat in response to inwardly directed self-loathing, whereas men were more likely to binge eat in response to strong negative emotions directed outward (Costanzo et al., 1999).

In support of this, violation of food rules was found to be a factor associated with binge eating in obese binge eating individuals, but more importantly, a change in mood was reported by 63 percent of participants, with mood becoming more negative before the binge (Arnow et al., 1992).

A comparison between obese BED individuals and obese non-BED individuals illustrated that the BED group displayed higher levels of dysphoric affect and greater levels of anxiety when general measures not directly relating to eating were utilised (Lazarus & Galassi, 1994). When examining the relationship between emotion and eating in obese individuals, there has been evidence to suggest that emotions strongly influence eating behaviour. Eating appears to reduce negative emotions such as anger, loneliness, boredom, and depression (Ganley, 1989). Unfortunately, this study on obese individuals did not distinguish between obese individuals with and without BED, therefore, it is difficult to generalise these findings to obesity per se.

It appears that the motivation for engaging in binge eating behaviour differs for people with BN and obese people with BED. Binge eating in the BN population appears to be motivated by a sense of power and control (Rossotto et al., 1996). For obese individuals who suffer from BED, binge eating is associated with a sense of failure, low self-esteem and negative mood (Arnow et al., 1992; Costanzo et al., 1999). When examining the motivation for binge eating, there is evidence to suggest that mood is not stable across a binge eating episode (e.g., Arnow et al., 1992). Therefore, exploring changes in emotion that occur across a binge eating episode can provide a further understanding of the behaviour.

6.4 CHANGES IN EMOTIONS ACROSS THE BINGE EPISODE

Mood states appear to differ at a variety of points in the binge episode, and there have been a number of studies that have examined the changes that occur in emotions across a binge eating episode. Some studies have focused on specific stages in a binge eating episode, such as antecedents to the binge, during the binge and after the binge. These studies, in combination, provide information about the changes that occur in emotional responses at different stages, and greater understanding of the binge eating behaviour. Comparisons of a similar behaviour that occurs in two different groups of individuals (BN and BED) can be made.

There have been a number of studies that have focused on changes across a binge eating episode in people with BN. In addition, there are studies that have examined changes across a binge episode for individuals who engage in binge eating, and those with BED.

6.4.1 Emotions Prior to Binge Eating

The different emotional states that initiate binge eating have been the topic of many investigations. It is believed that binge eating occurs when specific antecedent emotional states are present, and it has been theorised that the behaviour of binge eating provides immediate positively reinforcing or negatively reinforcing consequences (Stickney et al., 1999). These antecedent emotions play a critical role in the initiation of the binge eating behaviour, and subsequent changes in emotion serve to maintain it. Identification of antecedent emotional states that are generally aversive to the individual with subsequent changes in these emotional states during binge eating suggests that binge eating is maintained by negative reinforcement. When certain antecedents are more

intense, binge eating will result in emotions that are more reinforcing, in comparison to when antecedents are less intense or absent.

Negative affect is the most frequently identified precursor of binge eating for individuals with BN (Abraham & Beumont, 1982; Costanzo et al., 1999; Elmore & de Castro, 1990; Hsu, 1990; Johnson & Larson, 1982; Kaye et al., 1986; Lingswiler et al., 1989; Powell & Thelen, 1996), with depressed mood being one of the most commonly reported emotional states (Hsu, 1990). In a study by Powell and Thelen (1996), negative mood was found to be elevated prior to the binge from baseline levels. Mood was recorded every two waking hours, and baseline levels were the recordings of mood when the participants were not engaging in binge eating or purging. When examining individuals with BED, two studies reported that depressed mood was the third most commonly endorsed emotional state prior to the binge (Arnow et al., 1992; Mitchell et al., 1999).

Anxiety has frequently been reported to be elevated before binge eating in individuals with BN (Abraham & Beumont, 1982; Beebe, 1994; Hsu, 1990; Mitchell et al., 1999). Individuals have reported some symptoms associated with anxiety before a binge episode, such as palpitations, tremors and sweating (Abraham & Beumont, 1982). Hsu (1990) required subjects to choose a maximum of four feelings from a list of 15 to best describe their mood at various points across a binge eating episode. This study found that for the BN group anxiousness was the most commonly identified feeling before a binge. Hsu's study established that anxiety was a common feeling, but did not give any indication as to the intensity of this emotion.

In studies that have examined intensity, anxiety was at a moderate level before a binge, with this level being elevated in comparison to levels when not engaging in binge eating (Powell & Thelen, 1996). In support of this, anxiety before a binge was reported to be at a moderate level in individuals who engage in binge eating (Stickney et al., 1999). However, this study did not distinguish between BN and BED, and included normal weight, overweight and obese individuals within a relatively small participant group. Therefore, it is difficult to attribute these findings to a specific group of binge eating individuals. It seems that although the majority of studies have found that anxiety is present before a binge, the intensity of the anxiety has been found to vary from moderate to very high. When examining individuals with BED, feelings of anxiety were the most commonly endorsed emotional state in one study (Mitchell et al., 1999), and the second most common state in another (Arnow et al., 1992). In the first study, anxiety was described as "feeling anxious about something else", and in the second study it was described as "anxiety and agitation". The difference in descriptions may account for the variation in ratings for anxiety.

Anger has also been found to be a commonly reported emotion before a binge in individuals with BN (Hsu, 1990). In another study, anger at self has been reported to be higher than anger at others before the binge in individuals who engage in binge eating. However, the intensity of these emotions was only modest [2.81 and 2.38 respectively on a scale of 1 (not at all) to 5 (extremely); Stickney et al., 1999].

A retrospective interview was used to examine which emotions were present prior to a binge in a group of obese individuals who engage in binge eating (Arnow et al., 1992). Although no level of intensity can be gauged from

this study, it nonetheless indicated the most common emotions felt prior to a binge episode. All of the participants in this study reported an awareness of negative emotion before a binge eating episode. Anger and frustration (42%) were the most commonly reported emotions (Arnow et al., 1992). Unfortunately, this study did not utilise a control group to enable a comparison. In another study, obese individuals with and without BED were compared. In this study, anger was found to be the most commonly reported emotion prior to binge eating in the BED group (Kenardy et al., 1996).

Abraham and Beumont (1982) examined retrospective reports of precipitants to binge eating by individuals with BN. Of the 32 participants, 59 percent reported experiencing boredom. Hsu (1990) also found boredom to be reported before the binge. Additionally, Stickney et al. (1999) reported that boredom was rated at 3.69 before a binge [on a scale of 1 (not at all) to 5 (extremely)]. Of the antecedents examined, for before the binge, boredom was rated the second most intense antecedent in individuals who engage in binge eating.

Mitchell et al. (1999) compared BN and BED on potential sources of distress associated with binge eating. No significant differences were found in frequency or degree of precipitating emotional states. The items that were most frequently endorsed by the BN participants were feeling anxious about binge eating and feeling anxious about something else. The items with the highest frequency among the BED participants were feeling anxious about something else, feeling bored and having a depressed mood.

In summary, the antecedents for binge eating in individuals with BN and BED appear to be quite similar. Negative mood is clearly an important

precipitant to binge eating for individuals with BN and BED. For many, it may be that binge eating occurs in an attempt to cope with these negative emotions (Arnow et al., 1992; Kenardy et al., 1996). For individuals with BED, this elevation in negative mood is comparable with individuals with BN, but dissimilar to overweight individuals without BED. Elevated levels of negative affect, anxiety, anger and boredom have been reported in both BN and BED populations. However, many of the studies to date only indicated that certain emotional states were present and did not assess or report on the intensity of the emotion. Moreover, the majority of studies have examined either BN or BED and have not made a direct comparison between the two groups.

6.4.2 Emotions During the Binge

It has been hypothesised that binge eating behaviour serves the function of reducing intolerable emotions (Pitts & Waller, 1993). Therefore, it would be expected that the emotions reported during a binge episode would be different or less intense than those that have been reported to occur before a binge.

Three quarters of participants with BN reported that they experienced relief from negative mood states (defined as hopelessness, de-valuing of self and depression) while engaging in the binge eating behaviour (Abraham & Beumont, 1982). Additionally, during the first part of the binge many of the dysphoric feelings decreased, but these feelings were found to increase in the later stages of the binge when feelings of fullness began (Hsu, 1990). In contrast to this, during the binge episode individuals with BN have reported that subjectively they feel worse, with feelings of disgust, helplessness and guilt (Johnson & Larson, 1982). In support of this, the most commonly endorsed emotional responses for

individuals with BN were depressed mood and anxiety (Mitchell et al., 1999). These inconsistencies may be due to the fact that Hsu (1990) divided the period of binge eating into two components, whereas the other studies did not.

There have been inconsistent findings concerning the changes in anxiety from before the binge to during the binge. Powell and Thelen (1996) found that, for BN participants, there was no change in the level of anxiety from the beginning of the binge to the middle of the binge. Anxiety was at a moderate level (3.26 and 3.27 respectively, rated on a Likert Scale from 1 to 5) at each of these recordings. During the first part of the binge, Hsu (1990) found that fewer participants reported feeling anxious than before the binge. However, although there was a decrease in the reported severity, anxiousness was the equally highest reported emotion during a binge episode. In another study, one third of participants reported that they experienced relief from anxiety during the binge (Abraham & Beumont, 1982). Elevated levels of anger have been reported during the binge eating (Johnson & Larson, 1982).

For obese binge eating individuals, participants retrospectively reported that during the binge, feelings of worry and agitation and guilt were experienced by 16 percent of participants. Some participants reported feelings of warmth or pleasure while engaging in the binge eating behaviour (Arnow et al., 1992). Consistent with this, a comparison of women with BN and BED reported that women with BED were more likely to state that they enjoyed the taste, smell and texture of the food while binge eating (Mitchell et al., 1999).

In contrast to prior to the binge, where all participants reported feeling negative emotions, during the binge, 42 percent of obese BED participants reported feeling a positive emotion, 37 percent reported feeling a negative

emotion, and 21 percent reported no emotion (Arnow et al., 1992). However, inconsistent with this finding, depressed mood and anxiety have been reported to be the most commonly endorsed items for obese BED individuals during the binge (Mitchell et al., 1999). Because findings on emotional responses during the binge have been varied, it appears that emotional state is unstable and changeable throughout the binge eating episode.

A sense of relief may occur once the individual with BN begins to binge, but this may disappear when feelings of fullness are experienced. The sense of relief may then recur at the initiation of self-induced vomiting. Hsu (1990) believed that the reasons for the relief during the initial stages of binge eating are different to those associated with the relief during vomiting. The relief experienced as a consequence of binge eating is associated with the initial pleasant sensation of eating and perhaps also with the escape from dysphoric feelings. This is supported by findings that binge eating served the function of reducing awareness of negative, intolerable cognitions and emotions (Waller & Matoba, 1999). The relief obtained from vomiting has to do with the thought that the individual will not gain weight and relief from the intolerable fullness (Hsu, 1990).

There is no evidence that binge eating in BED consistently results in relief from negative emotions (Arnow et al., 1992; Mitchell et al., 1999). Only a minority of participants reported relief from negative mood, and among those who did, this relief was extremely short-lived. During the binge, negative mood was still strongly endorsed but, in addition, experiences of pleasure from eating were also reported (Arnow et al., 1992; Mitchell et al., 1999). It appears that during the binge there are differences in the emotional responses for individuals

with BN and BED. Hsu (1990) reported that there were differences in emotional responses at the first part of a binge compared with the later part of a binge. This indicates that there are specific changes that occur across an episode of binge eating. Studies also show a number of inconsistencies regarding emotional responses to binge eating during the binge. This may be due to methodological difficulties in eliciting information at this stage. To be able to examine and compare groups on these changes, it is important to clearly define the behaviour that is being measured. It is also imperative to examine the emotional response and its intensity.

6.4.3 Emotions After the Binge

Following the binge, for individuals with BN, mood appears to be influenced by the ability to induce vomiting. If vomiting is prevented, participants were more likely to report high levels of negative mood and anxiety (Abraham & Beumont, 1982). Analogous with this, for individuals with BN, high levels of negative mood or depression after the binge have been reported in a number of studies (Elmore & de Castro, 1990; Hsu, 1990; Lingswiler et al., 1989; Powell & Thelen, 1996). The findings on the level of anxiety after a binge episode have been varied. When anxiety was reported to be at a high level after the binge, it was found to decrease significantly after the individual had engaged in compensatory behaviours (Powell & Thelen, 1996). Other studies have reported anxiety to be at a moderate level following the binge (Elmore & de Castro, 1990; Hsu, 1990). Guilt and disgust have also been found to be elevated after a binge episode (Hsu, 1990).

In a study comparing BN and BED individuals, there were differences in frequency and degree of consequences of a binge eating episode. For the BN participants, the highest ratings were feeling physically ill, depressed and anxious. For the BED participants, physical discomfort, depression and fatigue were most commonly reported (Mitchell et al., 1999). Retrospectively, all obese BED participants stated that they were aware of negative emotions after a binge eating episode. After the binge the majority of participants reported feeling guilt, regret, and anger with self (95%; Arnow et al., 1992). In support of this finding, guilt was reported to be the most common emotion after binge eating in an obese BED group (Kenardy et al., 1996).

For the BN group, it appears that emotional state after a binge eating episode is largely influenced by the ability to induce vomiting. Therefore, anxiety is a commonly reported emotion. For both the BN and BED groups, guilt and depression are common emotional responses. Kenardy et al. (1996) theorised that negative emotions such as guilt are less aversive than the precipitant emotions that are commonly reported, such as anger and anxiety.

6.5 EMOTION AND EATING IN OBESITY

Emotion has been found to influence eating in people in general, however, the effect has been found to be stronger for obese individuals compared with non-obese individuals, and restrained versus unrestrained eaters (Canetti et al., 2002). Eating has been thought to reduce anxiety and, therefore, discomfort (e.g., Brunch, 1973; Kaplan & Kaplan, 1957). Studies that have compared obese BED individuals with obese non-BED individuals have reported that the BED group respond more strongly in terms of emotion and are more likely to eat in

response to negative emotions (e.g., Eldredge & Agras, 1996; Kenardy et al., 1996).

Emotions relating to the initiation and cessation of eating were examined in a group of obese individuals (Tuomisto, Tuomisto, Hetherington, & Lappalainen, 1998). Participants were required to complete self-monitoring diaries over a 24-hour period, recording their mood on a visual analogue scale prior to, and after eating. These authors found that tension and tiredness decreased significantly from before to after eating. In addition to this, irritability and sadness were found to decrease and happiness to increase, but none of these changes were statistically significant. This study has a number of limitations. The authors did not include a control group for comparative purposes and they did not control for binge eating in the obese participants. Therefore, these changes in mood cannot be attributed entirely to an obese non-BED group, and the results may have been contaminated by the inclusion of BED individuals.

In a comparison of overweight, normal weight and underweight individuals, emotional state was found to have different effects (Geliebter & Aversa, 2003). Underweight individuals reported eating less than the normal and overweight groups when experiencing a negative emotional state. This study provides partial evidence that overweight individuals eat more in response to negative emotions. However, there were no differences between the overweight and normal weight groups, therefore, this finding is not specific to overweight individuals.

Overweight individuals were found to be more likely to engage in emotional eating, and were more emotionally reactive, than normal weight

individuals in relation to snacks. However, this was not the case for meals (Lowe & Fisher, 1983).

In summary, the literature in relation to emotional eating in obese and overweight individuals is inconsistent. The difficulties appear to arise due to the lack of clear definitions of groups, and controlling for binge eating in the obese population. The evidence to suggest that obese individuals engage in emotional eating needs to be interpreted with caution.

6.6 SUMMARY

Negative mood was reported before, and throughout the binge eating episode in the majority of BN and BED participants, with different affective states reported at different stages of the binge. For BED participants, before the binge, anger, anxiety and depression appear to be the predominant emotions experienced, whereas after the binge subjects typically report feelings of guilt (Arnow et al., 1992). Arnow et al. (1992) concluded that relief from feelings of anger, anxiety and depression, even though replaced with another negative emotion of guilt, may be sufficiently rewarding to ensure the continuation of the behaviour. They also noted that absence of purge behaviour appears to deprive individuals with BED from any significant relief from negative mood.

There are several limitations when examining the literature on emotions in binge eating. The first is how the BED population was defined. Earlier studies investigating emotion in relation to obesity failed to control for individuals who did and did not engage in binge eating. This was evident from a review compiled by Ganley (1989). BED has been based on DSM-III or DSM-III-R criteria for BN using a semi-structured interview, with the exception that they did not

engage in compensatory behaviours (Arnow et al., 1992; Lingswiler et al., 1989). In more recent studies, DSM-IV criteria were used to define the population (Mitchell et al., 1999), or scales specific to binge eating (Greeno et al., 2000). In addition to this, binge eating was the only criterion in one study, with participants ranging from underweight to overweight, with no exclusion criteria (Stickney et al., 1999). Therefore, it is possible that this population included individuals with BN and BED.

A further problem when investigating the changes that occur over a binge eating episode is how to collect the information. Studies have varied in their methodology. Retrospective reporting during a clinical interview or questionnaire (Arnow et al., 1992; Mitchell et al., 1999), and real-time recording (Greeno et al., 2000; Lingswiler et al., 1989; Stickney et al., 1999) have been utilised. Both of these procedures have disadvantages. Real-time recording allows the individual to observe and record her emotional experiences at the time of binge eating before these emotions decay over time. However, monitoring at the time of the binge eating episode is time consuming and may be resisted by individuals for various reasons. It interferes with the binge eating process, and it requires the individual to record painful events that they are trying to ignore or reduce. Because of these problems with real-time recording, retrospective reporting offers a valuable alternative, as it does not interfere with the binge eating episode (Stickney et al., 1999). However, retrospective recording may dilute the emotional responses that are reported and emotional responses may become more generalised, rather than providing information regarding a specific episode. This methodology could be improved by requiring participants to focus on an actual episode of binge eating, rather than binge eating in general. Further,

it is unclear how studies have defined the time periods across a binge eating episode. It is important to clearly identify different stages to allow for greater clarity in the emotional responses that are being reported.

Information on the effect of emotions on eating in obese individuals without BED is limited. This is due to studies failing to control for binge eating in the obese and overweight population. Studies that have compared obese eating in both the BED and non-BED population report that the eating of individuals with BED is more greatly influenced by negative emotions.

CHAPTER 7

COGNITIONS ASSOCIATED WITH BINGEING

7.1 INTRODUCTION

From a cognitive behavioural perspective, the association between thoughts and emotions has been well established (Beck, Rush, Shaw, & Emery, 1979). Further, thoughts have been found to be an influential factor in the development and maintenance of BN (Cooper & Fairburn, 1992; Dritschel, Williams, & Cooper, 1991; Poulakis & Wertheim, 1993). Indeed, empirical investigations into the cognitions that are associated with binge eating have been predominantly undertaken with individuals who suffer from BN. There have been a limited number of studies investigating cognitions in other groups of individuals who engage in binge eating behaviour, such as sufferers of BED. Theories of BN have highlighted the importance of self-statements or automatic thoughts, disturbed information processing and underlying assumptions, beliefs or attitudes in the development of the disorder (Cooper, Todd, & Wells, 1998).

Dysfunctional cognitions are believed to cause, influence and maintain disordered eating behaviour in individuals with BN and those with sub-clinical eating disordered behaviour. Dysfunctional cognitions may specifically relate to concerns about food, weight, eating and shape, or they may be more general in nature (Cooper & Fairburn, 1992; Dritschel et al., 1991; Poulakis & Wertheim, 1993).

Cognitions regarding food, weight, eating and shape have been given less importance in relation to theories of obesity. However, some researchers have investigated the relationship between cognitions and the development of obesity (Adami et al., 1994, Garner et al., 1983b; Phelan, 1987). A problem with the literature is that earlier studies on obesity did not differentiate between individuals who engaged in binge eating and those who did not. Therefore, it is

difficult to attribute findings specifically to obesity without the influence of binge eating behaviour.

Depression has been found to be a common symptom among individuals with BN (Brewerton et al., 1995; Crow et al., 1996; Garfinkel, Lin et al., 1995; Zaider et al., 2002) and it has been demonstrated that cognitive distortion is a characteristic of depressive styles of thinking (Beck et al., 1979). This has led to research aimed toward examining the relationship between BN, distorted cognitions and depression. It has been suggested that the dysfunctional cognitions may be related to depressive styles of thinking rather than being specific to the eating disorder. Again, the majority of studies in this area have been with BN sufferers, and findings have been inconsistent.

In addition to examining general cognitive distortions and those associated with food and eating, it is important to examine changes in cognitions across a binge eating episode. It would be expected that there would be a change in cognitions from before to during and then after a binge episode. These changes in cognitions would be involved in the initiation and maintenance of binge eating behaviour (Powell & Thelen, 1996).

7.2 COGNITIVE DISTORTIONS UNRELATED TO FOOD AND EATING

From the literature it appears that people with BN have greater cognitive distortion than the general population. A number of earlier studies have reported that in people with BN, dysfunctional cognitions and irrational beliefs about the self and the external world are prominent (Goebel, Splathoff, Schulze, & Florin, 1989; Mizes, 1988; Schlesier-Carter, Hamilton, O'Neil, Lydiard, & Malcolm, 1989). There is more recent evidence to suggest that, in BN, there is a more

general dysfunctional thinking style rather than maladaptive beliefs specific to food, weight and shape (Leung, Waller, & Thomas, 1999, 2000).

The literature examining the relationship between BED and the level of cognitive distortions has been less extensive and detailed. It has been reported that people with BED often lack confidence in their ability to deal effectively with a world typically viewed as threatening, and use an external frame of reference in determining their self-worth (Kuehnel & Wadden, 1994).

A number of earlier studies investigated the association between bulimic symptoms and general dysfunctional cognitions by comparing participants with BN with non-eating disordered control groups on measures of irrational beliefs (Butterfield & Leclair, 1988; Goebel et al., 1989; Mizes, 1988; Schlesier-Carter et al., 1989; Steiger, Fraenkel, & Leichner, 1989; Steiger, Goldstein, Mongrain, & van der Feen, 1990). In these studies, scores for the BN groups were significantly higher than non-eating disordered control group scores on total scales and numerous subscales examining irrational or dysfunctional beliefs. In support of these findings, Leung et al. (1999) also found that women with BN showed a greater number of unhealthy core beliefs than non-eating disordered women.

Studies of the relationship between irrational beliefs and bulimic symptoms have also been undertaken examining female undergraduates. These studies reported that participants with bulimic tendencies obtained higher scores on measures of irrational beliefs (Lohr & Parkinson, 1989; Mayhew & Edelmam, 1989; Ruderman, 1986). Those who scored highly on the bulimia scale were more prone to distorted cognitions of a rigid, perfectionist and demanding nature

(Ruderman, 1986). All of these earlier studies suggested an association between dysfunctional cognitions and BN.

Poulakis and Wertheim (1993) utilised questionnaires based on both Beck's and Ellis' views of cognitive distortion and reported that cognitive disturbance was associated with bulimic tendencies. Subjects with higher Bulimia Test scores demonstrated more dysfunctional attitudes, irrational beliefs and reasoning errors reflective of both structural (Beck et al., 1979) and thematic (Ellis & Harper, 1975) cognitive dysfunction. This study suggested that dysfunctional beliefs are related to the extent of bulimic symptomatology.

Friedman and Whisman (1998) applied the sociotropy and autonomy theory postulated by Beck (1983) with regard to depression. Sociotropy is a "need for approval from others and a strong investment in the maintenance of attachments and avoidance of social rejection" (Friedman & Whisman, 1998, p. 440). Autonomy is an "exaggerated concern with performance evaluation and a strong investment in personal independence, control and achievement" (Friedman & Whisman, 1998, p. 440). It was found that both sociotropy and autonomy were significantly associated with bulimic symptomatology, but in contrast to previous findings, only the relation with sociotropy remained statistically significant after controlling for the effects of depressive symptoms. Therefore, it appears that concern about approval from others is a characteristic of BN. These results suggest that bulimic symptomatology is related to core beliefs concerning the need for acceptance and approval (Friedman & Whisman, 1998).

Some evidence exists of a relationship between BED and cognitive distortions. In examining cognitive distortions in a variety of eating disorders

using the Bulimia Cognitive Distortion Scale, it was found that cognitive distortions and indices of eating disorders fall along a continuum based on symptom severity. The level of cognitive distortions was found to be highest in the BN-purging group, followed by BN-nonpurging type, BED, and Eating Disorder Not Otherwise Specified (EDNOS), with the non-eating disordered group having the lowest level of distortion (Walsh, 1996). When comparing a BED group with Night Eating Syndrome and non-eating disordered obese groups, the BED group had more cognitive distortions (Powers, Perez, Boyd, & Rosemurgy, 1999).

When a more general measure of cognitive distortions was employed, the findings supported those of Powers and colleagues (1999). A study by Kuehnel and Wadden (1994) utilising the Dysfunctional Attitudes Scale (DAS) centred on a university-based weight control program and divided female participants into three groups, those who did not binge eating, a problem eating group and a BED group. The problem eating group was defined as individuals who reported binge eating, but did not meet the frequency requirement for BED. It was found that the BED group scored significantly higher than the non-binge eating group on three out of nine of the subscales of the DAS. They were vulnerability, need for approval and need to please others. The problem eating group scored significantly higher than the non-binge eating group on the imperatives subscale. Importantly, there were no significant differences between the BED group and the problem eating group. Consistent with these results, Lazarus and Galassi (1994) reported that an obese binge eating group exhibited more dysphoria related cognitions than an obese non-binge eating group as measured by the DAS. However, when they controlled for levels of depression, this difference

was no longer significant. This suggests that cognitive differences between these two groups may be a reflection of the levels of depression rather than independent factors.

Not all research results have established a link between people with eating disorders and general cognitive distortion. Dritschel et al. (1991) compared cognitive distortions unrelated to eating in individuals who engaged in objective binge eating (as defined by the EDE), those who perceived themselves as engaging in binge eating and a non-eating disordered control group. The cognitive distortions examined were personalisation, overgeneralisation, catastrophising, and selective abstraction. In comparison to other studies, it was reported that those who engaged in objective binge eating did not differ from the other two groups on any of the four types of general distortions examined. It was found that people who presented with objective binge eating engaged in significantly more personalisation, overgeneralisation, catastrophising, and selective abstraction on the questionnaire items concerning food, eating, shape and weight than the other two groups. However, of the 18 participants in the objective binge eating group, only two met the diagnostic criteria for BN, and for the perceived binge eating group, they had not experienced a bulimic episode of an objective or subjective nature. Therefore, it is unclear how these two groups could be compared to previous studies where groups have been clearly defined based on DSM-III or DSM-IV diagnostic criteria. However, in support of the finding of Dritschel et al. (1991), non-eating related cognitive distortion was demonstrated to be a prominent feature of AN, but not BN or subclinical eating disturbances (Strauss & Ryan, 1988).

In summary, research into general cognitive distortions in people with eating disorders has focused on BN and AN. The literature reports contradictory findings as to the extent of general cognitive distortion in sufferers of BN. However, when groups have been defined using DSM-III or DSM-IV diagnostic criteria for BN (e.g., Leung et al., 1999; Powers et al., 1999), it appears that BN is associated with greater cognitive distortion than non-eating disordered controls.

The few studies that have focused on BED have indicated that cognitive distortions are generally more evident than for non-eating disordered control groups (Kuehnel & Wadden, 1994; Powers et al., 1999; Walsh, 1996) and more evident than for individuals with less clinically serious eating disorders, such as EDNOS and NES (Powers et al., 1999; Walsh, 1996), when using a scale specific to eating disorders. However, when a more general measure was utilised, the findings suggested that differences between BED and other less clinically significant eating disorders, such as EDNOS and NES, were not statistically significant. However, there were still significant differences between non-binge eating and BED individuals in some areas (Kuehnel & Wadden, 1994). This differs to the findings for individuals with BN, where cognitive distortions have been found to be significantly more evident than in less clinically significant eating disorders. Therefore, it appears that individuals with BN have more cognitive distortions than BED, indicating that BN is a more serious eating disorder. However, individuals with BED appear to have more cognitive distortions than other, less serious, eating disorders.

As cognitions are believed to initiate and maintain disordered eating behaviour (e.g., Cooper et al., 1998; Poulakis & Wertheim, 1993), it may be that

cognitive distortions that are specifically related to aspects of the eating disorder rather than being more general in nature may be a more defining feature. These thoughts may be related to food, eating and body shape and weight.

7.3 FOOD AND BODY RELATED COGNITIVE DISTORTIONS

There have been inconsistent findings when measuring the level of general cognitive distortions in subjects with BN. However, when studies have looked at specific cognitive distortions about the themes of body shape, weight, and food, the findings have been consistent. It has been acknowledged that people with BN have cognitive distortions surrounding the themes of body shape and weight (Bonifazi & Crowther, 1996; Dritschel et al., 1991), are preoccupied with food and eating, and have self-deprecatory thoughts (Bonifazi & Crowther, 1996). It has been suggested that these cognitions maintain disturbed eating habits, in part, by the mediating effect of dietary restraint (Dritschel et al., 1991).

For individuals with BN, it has been reported that underlying assumptions and beliefs are reflected in self-statements or automatic thoughts about eating, shape and weight. These thoughts are moment to moment thoughts that occur throughout the day (Cooper et al., 1998). Information processing errors, systematic distortions in the processing and interpretation of events, can be detected at the level of underlying assumptions and automatic thoughts. Cooper et al. (1998) cited two studies that reported different structures that may be important in individuals with eating disorders. These structures were personal identity and self-schemata. These are both beliefs and rules on which individuals operate and around which they organise their lives. Furthermore, both were reported to be important in organising and influencing experience, such as

determining perceptions, thoughts, affect and behaviour. The content of both structures appears to consist of negative beliefs about the self. The core psychopathology of eating disorders was determined to be represented in weight-related self-schemata.

Research examining cognitive distortions specific to food and body for people with BED has been limited. The distinction between individuals who are obese and obese BED individuals has been an important one. Prior to this, it was unclear whether the effect of obesity may have influenced cognitions regarding body shape and weight, and food. That is, obesity, independent of binge eating, may be associated with greater emphasis on body shape and weight as a facet of self-worth (Eldredge & Agras, 1996). In the small number of studies that have examined BED to date, it appears that an over concern for weight and shape is not dependent on obesity, but is a feature specific to BED (Eldredge & Agras, 1996; Marcus et al., 1992; Marcus, Wing, & Hopkins, 1988; Spitzer et al., 1993). Moreover, in obese binge eating individuals, mood was not found to improve as a function of weight loss, indicating that psychological distress in obese binge eating individuals may not be closely related to current weight (Marcus et al., 1988).

Obese women have been found to have significantly greater body dissatisfaction than non-obese women (Adami et al., 1994; Sarwer, Wadden, & Foster, 1998). Cognitions regarding body dissatisfaction were examined in obese women (Wardle, Waller, & Fox, 2002), and it was reported that those with early onset obesity had greater body dissatisfaction, independent of current BMI. Unfortunately, this study did not control for binge eating. Sorbara and Geliebter (2002) examined body disturbance, controlling for binge eating. The results of

the study found that participants with early onset obesity demonstrated more body image disturbance than those with adult onset obesity, and this finding was consistent before and after weight loss. Further, obese individuals with binge eating were found to exhibit a higher level of body dissatisfaction than obese non-binge eating individuals.

Dysfunctional cognitions in obese individuals relating to weight, food and eating were examined, with normal weight and previously overweight comparison groups. Overweight individuals reported a greater endorsement of dysfunctional weight, food and eating cognitions than normal weight individuals (O'Connor & Dowrick, 1987). A limitation with this study is that it did not control for binge eating and, therefore, it is difficult to attribute these findings as being specific to obesity per se. In another study, thoughts relating to food, eating and body image were examined in normal weight and obese females (Hunt & Rosen, 1981). Individuals were required to self-monitor their thoughts using a random time-sampling procedure. No differences were found in terms of the frequency and quality of the thoughts, suggesting that obese individuals may not exhibit cognitive distortions.

There does appear to be indirect evidence that obese individuals have distorted cognitions in relation to their body shape and weight. Cognitive behaviour therapy has been shown to be effective in reducing these cognitions (Rosen, Orosan, & Reiter, 1995). However, weight remained unchanged in this study, indicating that the behavioural aspect of eating in non-binge eating obese individuals is the main contributor to weight gain.

Differences in general cognitive distortions between obese binge eating and obese non-binge eating groups were found to be non-significant when levels

of depression were controlled. However, differences in cognitive distortions regarding eating and dieting were found to be independent of levels of depression in the obese binge eating group (Lazarus & Galassi, 1994).

It is important to note that obese non-binge eating individuals have been found to rate self-schema and self-efficacy at similar levels to individuals with BN, and at significantly higher levels than a normal weight control group (Phelan, 1987). That is, obese non-binge eating participants felt more negatively about their body and had a sense of being heavy, and rated themselves as less effective in maintaining their weight and diets than normal weight controls. The fundamental difference between obese non-binge eating participants and BN participants was that the obese non-binge eating participants endorsed significantly lower levels of the salient beliefs that are specific to BN. Examples of these are feeling out of control with eating, and unrealistic expectations about the consequences of eating certain foods (Phelan, 1987). The conclusion drawn from these results was that although obese non-binge eating individuals have self-schema and self-efficacy levels comparable to individuals with BN, these thoughts are not considered to be distorted or exaggerated.

In summary, cognitive distortions regarding body shape, weight and food have been found to be a core feature of both BN (e.g., Bonifazi & Crowther, 1996; Cooper et al., 1998; Dritschel et al., 1991; Phelan, 1987) and BED (e.g., Eldredge & Agras, 1996; Marcus et al., 1988, 1992; Spitzer et al., 1993). It appears that cognitive distortions found in the BED group are not due to co-existing obesity, but relate specifically to the eating disorder. Obese non-eating disordered individuals have been found to be comparable to normal weight non-eating disordered individuals (Hunt & Rosen, 1981).

There are two areas that have been studied regarding cognitions relating to body shape and weight, and food. These are the content of the dysfunctional beliefs, indicating that what the person is actually thinking is specific to the eating disorder, and the consequence of the dysfunctional belief. The literature examining the content of dysfunctional beliefs in BED is derived from the literature for BN, utilising questionnaires that have commonly been administered to eating disordered people. There has been limited research on the consequence of dysfunctional beliefs in BED.

7.3.1 Content of dysfunctional beliefs

It has been reported that both subjects with BN and non-eating disordered controls want to be lighter than the normal weight suggested for their height (Thompson, Berg, & Shatford, 1987). However, participants with BN were found to have a higher drive for thinness than non-eating disordered controls. This suggested that although they both reported wanting to be lighter, the BN group had a higher motivation to reach this goal. Thompson et al. (1987) reported that the bulimic group had more cognitive distortions regarding food and weight than non-eating disordered controls. The bulimic group also demonstrated more perfectionism, dichotomous thinking, worry, exaggeration, superstitious thinking and personalisation than the control group. On the EDI subscales, the BN group scored higher on Drive for Thinness, Bulimia, Body Dissatisfaction, Ineffectiveness, Perfectionism, and Interoceptive Awareness. It was concluded that this data suggested several maladaptive cognitive patterns coexisted with BN.

Two main types of beliefs were elicited from participants with BN. These were beliefs about the self, and beliefs about shape, weight and eating (Cooper et al., 1998). Beliefs about the self were negative and unconditional. The beliefs included thoughts of worthlessness, uselessness, inferiority, failure, and being abandoned and alone. Beliefs about weight shape and eating were generally conditional assumptions, and focused on the personal meaning of being fat and thin, and on the personal meaning of eating. It was concluded that these conditional statements provided a link between automatic thoughts and images and negative self-beliefs. Three types of assumptions were identified: those linking shape, weight gain and weight loss with social- and self-desirability; those linking eating with self control; and those linking bingeing behaviour to cognitive and emotional control (Cooper et al., 1998).

The Bulimic Cognition Inventory (BCI; Zotter & Crowther, 1991) was used to record the thoughts of BN subjects in a naturalistic setting and in a laboratory setting while eating a standardised meal (Bonifazi & Crowther, 1996). The BN group was compared with individuals with restrained eating and non-eating disordered controls. Women with BN were reported to have significantly more thoughts related to food, eating, and weight, and low self-efficacy. Additionally, participants in the BN group had more thoughts that were more negative and distorted, and the thoughts were more intense. Unfortunately, this study did not examine changes in the thoughts occurring during a binge and a normal meal, which may differ in some crucial way.

People with BN were shown to have elevated levels of salient beliefs regarding food and weight when compared to non-eating disordered controls (Powell & Thelen, 1996). They have also been found to exhibit more extreme

and constricted thinking. They reported feeling "completely in control or completely out of control, very virtuous or extremely indulgent, and either perfectly normal or very abnormal" (Butow, Beumont, & Touyz, 1993, p.326).

Certain characteristic beliefs may mediate bulimic eating behaviours and maintain abnormal attitudes towards food for individuals with BN. These beliefs may include unrealistic expectations of what will happen if any forbidden food is consumed, for example, "if I eat sweets I'll get fat", as well as a general sense of being out of control with food, for example, "I crave food" (Phelan, 1987, p.595).

Individuals suffering from BED have also been found to have an over concern with body shape and weight (Kuehnel & Wadden, 1994; Spitzer et al., 1993) and hold rigid and perfectionistic attitudes about dieting (Gormally, Black, Daston, & Rardin, 1982; Marcus et al., 1985, 1988). A well designed study comparing obese binge eating individuals with obese non-binge eating individuals identified four cognitive variables that differentiated between the groups. These variables were drive for thinness, ineffectiveness, disinhibition, and automatic eating behaviour (Lazarus & Galassi, 1994). In addition, another study identified that obese binge eating individuals indicated more negative self-evaluations influenced by shape, weight or eating than obese non-binge eating individuals (Nauta, Hospers, Jansen, & Kok, 2000).

The cognitions of obese BED and obese non-BED individuals were compared by Nauta, Hospers, Jansen et al. (2000). Both quantitative and qualitative differences were found between these two groups. Obese BED individuals had more negative self-evaluations than the obese non-BED group. Further, they believed in these evaluations and automatic thoughts to a greater

extent. The content of the negative self-evaluations differed between the two groups. Negative self-evaluations influenced by shape, weight or eating were more frequently found in obese BED individuals. Negative self-schemas for obese individuals with BED were most frequently related to rejection and a lack of self-worth. For obese non-BED women, negative self-schemas were associated with a lack of willpower.

In a study by Peterson and colleagues (1998), using the Body Shape Questionnaire (BSQ) to assess body dissatisfaction, individuals with BED were found to have elevated body image concerns (defined as scores greater than or equal to 110 on the BSQ (Zabinski et al., 2001)). In support of this finding, Barry and colleagues (2002) examined 182 adults with BED and also found elevated scores on the BSQ for both males and females. Although both males and females had elevated concerns, females had significantly greater concerns than males. When comparing the level of body dissatisfaction based on the BSQ, comparable levels have been reported for individuals with BED (141.6, Barry et al., 2002) and BN (136.9, Cooper, Taylor, Cooper, & Fairburn, 1987).

For the EDI subscales, obese people with BED were found to have elevated scores on the Body Dissatisfaction subscale (Barry et al., 2002; Kuehnel & Wadden, 1994; Lazarus & Galassi, 1994). In addition to this, from the EDE-Q, they were found to have high levels of Weight and Shape Concern (Barry et al., 2002), significantly higher than obese non-eating disordered controls, but not significantly different to the obese EDNOS group (Eldredge & Agras, 1996). Obese women were found to have elevated scores on all subscales of the EDI compared to normal weight women (Adami et al., 1994). This indicates that among the obese, weight alone does not appear to influence the importance of

weight and shape. The presence of BED appears to be the factor associated with greater concerns about weight and shape (Eldredge & Agras, 1996). In support of this finding, body dissatisfaction was found to be a component of their binge eating symptoms for obese BED sufferers (Womble et al., 2001). When comparing a BED group with NES and non-eating disordered obese groups, the BED group had greater body image disturbance (Powers et al., 1999). As previously mentioned, no differences were found in terms of the frequency and quality of the thoughts relating to food, eating and body image in normal weight and obese females (Hunt & Rosen, 1981).

In summary, both individuals with eating disorders and non-eating disordered controls have been demonstrated to have a degree of distorted thoughts associated with body weight, shape and food. However, when these groups are compared, individuals with eating disorders have significantly higher levels of cognitive distortion. Individuals with BN have consistently been reported to have high levels of cognitive distortion (e.g., Cooper et al., 1998; Powell & Thelen, 1996; Thompson et al., 1987) when compared with non-eating disordered controls. Further, individuals with BED have also been found to have elevated levels of cognitive distortions (e.g., Kuehnel & Wadden, 1994; Nauta, Hospers, Jansen et al., 2000; Nauta, Hospers, Kok, & Jansen, 2000; Spitzer et al., 1993) in comparison to obese non-eating disordered individuals. This provides evidence that the elevated level of cognitive distortions observed in the BED group cannot be attributed to weight alone. In comparing individuals with BN and BED, there is evidence to suggest that these two groups have similar levels of body dissatisfaction. However, from the studies to date, individuals with BN

appear to hold more rigid and perfectionistic beliefs about food, eating and body shape.

7.3.2 Consequences of dysfunctional beliefs

As mentioned, in addition to the research on the content of distorted cognitions, there has been consideration of the consequences for the individual of dysfunctional thinking. People suffering from BN may consider themselves to be overweight, although their actual weight tends to fall within the normal range (Phelan, 1987). These unusual beliefs about shape and weight are thought to have a causal role in the maintenance of the disturbed behaviour characteristic of eating disorders. These beliefs hold great personal significance and are dysfunctional because they are rigid and extreme (Cooper et al., 1998). In contrast to this, individuals with BED tend to be overweight. Therefore, although they endorse high levels of weight and shape concern, and high levels of body dissatisfaction and drive for thinness, these beliefs may be associated with their weight. However, findings have indicated that the level of concern obese BED sufferers report is significantly greater than those of non-eating disordered obese, indicating that the elevated level of weight and shape concern is essential in the diagnosis of BED (Eldredge & Agras, 1996).

Individuals with BN see themselves as overweight and also rate themselves as ineffectual in following standard diet programs. They have been unable to diet effectively in the past and this may lead to expectations that they may not be able to diet in the future. These expectations of future failure, or low self-efficacy regarding dieting, may lead to the persistence of maladaptive weight control techniques such as vomiting or laxative abuse (Phelan, 1987). Phelan

(1987) found that in BN certain self-perceptions about body weight exaggerate the extent to which the individual believes him or herself to be overweight. Individuals with BN respond the same as obese women on Bulimic Thoughts Questionnaire (BTQ) items reflecting weight self-schema. This exaggeration or distortion in body weight self-schema can lead to very restrictive dieting. One of the reasons people with BN may fail on their diets is that they tend to initiate extremely rigid and restrictive diets. This leads to breaking the diet and overeating.

A critical difference between bulimic women and obese women is that obese individuals do not entertain the salient beliefs specific to BN. Phelan (1987) found these beliefs to be related to thoughts such as "one is not worth anything if one is fat", "certain kinds of food will result in a rather drastic amount of weight gain", and "any non-diet food results in instant weight gain" (p. 599). People with BN believe that weight gain will be the result of consuming a small amount of non-diet food. Phelan (1987) compared individuals with BN with obese and normal weight non-eating disordered controls. She excluded participants who engaged in binge eating. Therefore, although conclusions can be made regarding differences between BN and obese groups, no conclusions regarding obese individuals with BED can be made.

Cooper et al. (1998) reported that all BN participants in their study believed that dieting helped with their negative self-beliefs. Dieting made them feel more successful, less of a failure and more in control. Patients believed that being thin meant that less was expected of them or that other people were more likely to accept them. Being liked and accepted meant that they would not end up lonely and alone in the way they feared.

A possible mechanism for dysfunctional cognitions in relation to binge eating has been suggested (Lingswiler et al., 1989). It has been found that for both participants with BN and those who engage in binge eating, bingeing might be triggered by polarised, dichotomous cognitions that allow only for dieting or overeating. It was concluded that the risk for binge eating is greatest when the individual with BN has high levels of psychological distress. The binge is then triggered by dichotomous cognitions (Lingswiler et al., 1989). It has also been suggested that dichotomous thinking results in a reduction of tolerance of uncertainty, which leads to a lack of trust of internal regulatory mechanisms causing an over dependence on self-control (Butow et al., 1993). For individuals who only engage in binge eating behaviour, mechanisms are less clear. It is suggested that people who binge eat appear to be especially unresponsive to hunger cues in comparison to individuals with BN and non-eating disordered controls. However, it was clear that dichotomous cognitions were still involved in producing the binge episode in binge eating participants (Lingswiler et al., 1989).

In summary, the majority of the research has examined the consequence of dysfunctional beliefs for individuals with BN. Dysfunctional beliefs have been theorised to have a causal role in the maintenance of disturbed eating behaviour in individuals with eating disorders. With regard to binge eating, dichotomous cognitions have been found to be the trigger for engaging in this behaviour in individuals with BN (Lingswiler et al., 1989).

7.3.3 Summary

In summary, it appears that cognitive distortions that are related to eating and the body are occurring in individuals suffering from BN and BED. It is clear that both of these groups have these dysfunctional beliefs, however, the consequences of these beliefs in BED individuals have not been investigated in the literature to date. It has been described that binge eating in populations other than BN, such as in obese individuals, cognitions differ to those found in individuals with BN. Therefore, it cannot be assumed that cognitions associated with binge eating can be generalised across different disorders.

It is important to recognise that cognitive distortions have been found to be associated with BN and BED, as have symptoms of depression. Cognitive distortions are generally known to occur in people when they are suffering from depression. This has raised the question of whether the cognitive distortions evident in people with eating disorders are due to the eating disorder, or are related to the depressive symptoms that have been found to be elevated in individuals with eating disorders.

7.4 DYSFUNCTIONAL COGNITIONS AND DEPRESSION

Individuals with depression have been shown to have higher levels of distorted thinking than individuals without depression (Beck et al., 1979). Depression has also been linked with BN (see Hinz & Williamson, 1987 for a review). Given the association between BN and depression, there is increasing evidence that distorted thinking is common in BN (e.g., Leung et al., 1999; Powers et al., 1999). A number of studies have investigated whether the higher

levels of distorted thinking in BN are due to the co-existing mood disorder or the eating disorder (e.g., Poulakis & Wertheim, 1993; Ruderman, 1986).

The reported prevalence rates of a current mood disorder among people with BN has been varied. In one study, depression was reported to be present in 24 to 33 percent of people who have BN (Joiner, Metalsky, & Wonderlich, 1995). However, even higher rates of depression have been reported, with a review of the literature indicating the prevalence between 25 to 75 percent of BN sufferers (Hinz & Williamson, 1987). Levels of depression have been found to be higher in individuals with BN than control groups and a positive correlation between depression scores and BN has also been reported (Poulakis & Wertheim, 1993). It has been acknowledged that people with BN have marked depressive symptomatology and any cognitive distortions detected could reflect a general tendency towards negative styles of thinking arising from the depression and not from the disordered eating (Dritschel et al., 1991).

Depression may be a critical dimension of BN. A review of the hereditary factor of depression in people with BN concluded that there was a greater family history of depression among BN sufferers than among non-eating disordered control subjects (Greenberg, 1986; Powers, Schulman, Gleghorn, & Prange, 1987). However, a review of the literature examining the relationship between BN and depression, and comparing family history, concluded that those studies that had found a significant relationship did not use a control group. Additionally, interviewers knew that all the people interviewed suffered from BN. Only one study used a well controlled design, and found no significant relationship between BN and a family history of depression. Nevertheless, mood disorder was more common in the BN group. This indicated that BN may have

an aetiology different from that of a mood disorder (Hinz & Williamson, 1987). Other evidence linking BN and depression is the fact that a number of studies have found an improvement in both the depression and eating behaviour with the use of various antidepressant medications (Powers et al., 1987).

In individuals with BED, it has been found that there is often a history of depression (Spitzer et al., 1993), and that negative affect (depression, low self-esteem and neuroticism) is a part of the binge eating symptom cluster (Womble et al., 2001). Major Depressive Disorder is the most common Axis I diagnosis (46% to 51% lifetime prevalence) associated with BED (Mussell et al., 1996; Telch & Stice, 1998; Yanovski et al., 1993). Interestingly and in contrast, people with BED have been found to have only minor levels of depression based on the Hamilton Depression Rating Scale (Peterson et al., 1998), and mild levels of depression based on the Beck Depression Inventory (Barry et al., 2002; Kuehnel & Wadden, 1994; Lazarus & Galassi, 1994; Marcus et al., 1988; Powers et al., 1999). It appears that BED is associated with some level of depression, although the reported severity is not consistent.

Nevertheless, there is commonality between BED and BN. Webber (1994) compared obese BED individuals, normal weight individuals with BN and overweight and normal weight non-eating disordered controls. It was found that the BED and BN groups, regardless of their weight, shared similar emotional difficulties.

Depressed mood has been also found to relate to the urge to binge eat in those with BED (Dounchis, 2001). When comparing obese binge eating and obese non-binge eating groups, the binge eating group was found to have higher general psychopathology, in particular depression, than the non-binge eating

group (Kuehnel & Wadden, 1994; le Grange et al., 2001; Marcus et al., 1988; Telch & Agras, 1994). Consistent with these findings, Marcus et al. (1990) compared BED and obesity and reported that 32 percent of BED individuals met the diagnostic criteria for a mood disorder, compared with eight percent of obese non-binge eating participants.

Individuals with BED had a significantly higher score than non-binge eating and problem eating groups on the Automatic Thoughts Questionnaire, which measures the frequency of negative automatic thoughts. This indicates that people with BED experience depressive cognitions more frequently than the other two groups (Kuehnel & Wadden, 1994).

The thinking styles of patients with BN are characterised by cognitive distortions related to body shape and weight. It has been found that these styles of processing are similar to those found in depressed people (Dritschel et al., 1991). Both general and specific cognitive distortions were significantly and positively correlated with scores on the BDI.

The premise of the hopelessness theory of depression has been applied to people with BN (Joiner et al., 1995). It was postulated that people with BN would be more susceptible to depression if they had a generalised tendency to attribute negative events to stable, global factors (negative attributional style) than if they exhibited a generalised tendency to attribute such events to unstable and specific factors (positive attribution style). Findings have supported this, with a positive attributional style acting as a buffer against an increase in depressive symptoms, whereas a negative attributional style was associated with increases in depressive symptoms. It was concluded that bulimic symptoms temporally precede onset of depressive symptoms among cognitively

predisposed individuals, whereas depressive symptoms do not precede bulimic symptoms. In support of this, it has been concluded that, in most cases, people suffering from BN develop depressive symptoms after the onset of eating disturbance (Laessle, Kittl, Fichter, Wittchen, & Pirke, 1987). However, it was suggested that it is not bulimic symptoms alone that culminated in depressive symptoms, but the combination of bulimic symptoms and negative attributional style which resulted in depressive symptomatology (Joiner et al., 1995).

The apparent relationship between dysfunctional cognitions and BN may simply reflect their shared variance with depression. Poulakis and Wertheim (1993) cited three studies in which cognitive measures failed to significantly relate to BN when depression was controlled. Questionnaires based on two different approaches, those of Beck and Ellis, found that bulimic tendencies resulted in greater levels of depression (Poulakis & Wertheim, 1993). When depression was controlled for, it was found that the predictiveness of the cognitive variables was reduced, suggesting that the relationship between BN and dysfunctional cognitions may reflect their respective associations with depression. However, dysfunctional cognitions also contributed to a small amount of unique variance, indicating an association with bulimic tendencies over and above depression. From the results it was concluded that both depression and dysfunctional cognitions are implicated in the occurrence of bulimic tendencies. These findings are consistent with the idea that dysfunctional cognitions and depression both act as risk factors for the development of BN.

When comparing the score on a BN scale with depression, it was found that individuals who scored higher on the BN scale also reported more depressed

thoughts. This indicates that BN is related to depression. However, it was also found that these depressed thoughts were not distorted like those which characterise depressed individuals (Ruderman, 1986). The bulimia scores were found to correlate with depressive distortions that emphasise negative outcome, but are logically valid (depressive-nondistortions). There was no correlation with depressive distortions that again involve negative outcome, but involve assumptions that are not valid (depressive distortions). Depressive distortions have been found to be specific to individuals with clinical depression, whereas the depressive-nondistortions may be present in many psychiatric disorders (Krantz & Hammen, 1979).

It is unclear to what extent the symptomatology of eating disorders is linked to the development of depressive symptomatology (Laessle, Kittl, Fichter, & Pirke, 1988). It has been stated that cognitive characteristics are significantly related to depression in the BN. Negative body attitudes accounted for the greatest amount of variance in the depression scores, and depression was associated with the "perfectionism" subscale of the EDI. It was concluded that negative body attitude is more directly related to self-concept. Perfectionism might be indicative of cognitive schemata with extremely thin weight standards as a central feature. Such self-imposed pressure towards an ideal body shape and weight may then lead to an extremely negative self-evaluation of one's body and a negative concept in general, which is most clearly related to depression according to the Beck model. Depressive symptoms may be a labile feature arising as a consequence of distorted attitudes and irrational beliefs (Laessle et al., 1988).

In summary, from the literature there appears to be a strong association between BN and depression. Additionally, depression also seems to be associated with BED but to a lesser extent than for BN. Depressive symptomatology does not appear to explain the degree of cognitive distortion that is found in sufferers of BN. However, there is some evidence that depression is related to general cognitive distortion in BED, but cannot explain the level of cognitive distortion specific to food, eating and weight (Lazarus & Galassi, 1994). It may be that the depressive symptomatology leads to increases in the general level of cognitive distortions, but does not explain the specific cognitive distortions relating to food and eating. It may be that these specific cognitive distortions are what initiates and maintains the binge eating behaviour, and by studying the change in cognitions over a binge episode it is possible to obtain information regarding this.

7.5 CHANGES IN COGNITIONS ACROSS THE BINGE EPISODE

Distorted cognitions are thought to play a crucial role in the initiation and maintenance of BN (Powell & Thelen, 1996; Thompson et al., 1987). However, it cannot be assumed that these cognitions remain constant throughout a binge eating episode. Thoughts would be expected to vary across time, and these changes may be involved in maintaining dysfunctional eating behaviour (Powell & Thelen, 1996). Systematically examining cognitions across a binge eating episode may provide insight into how the behaviour is perpetuated. This information could be used to develop targets for cognitive-behavioural interventions.

There have been a number of studies that have attempted to measure the change in cognitions over a binge eating episode in BN (Arnow et al., 1992; Cooper et al., 1988; Powell & Thelen, 1996). Unfortunately, there has not been as much research in the area of BED. Studies have investigated cognitions before and after a binge in an obese population that engages in binge eating, but have failed to include information about what occurs throughout the binge.

7.5.1 Cognitions Prior to Binge Eating

Distorted cognitions immediately prior to the onset of a binge have been reported to be particularly evident. It has been found that in a BN group and a group who engage in binge eating, there were significantly more dichotomous cognitions than in a non-eating disordered control group (Lingswiler et al., 1989). Prior to a binge, BN subjects reported feeling heavier and endorsed more salient beliefs regarding food and weight than they did prior to a normal meal (Powell & Thelen, 1996). This feeling of heaviness prior to a binge represented an increase from baseline. The stronger cognitions regarding feeling heavy and the belief that they could not maintain a diet, along with elevated levels of negative affect may have resulted in the reported break in dietary restraint.

In subjects with BN, the urge to eat increased at the same time as the level of preoccupation with thoughts of food. As their preoccupation with thoughts of food increased, so did the perceived level of willpower needed to stop eating (Halami & Sunday, 1991). As mentioned in Chapters 5 and 6, it has also been reported that feelings such as tension, anxiety (Abraham & Beumont, 1982; Mitchell, Hatsukami, Eckert, & Pyle, 1985), loneliness, and boredom (Abraham & Beumont, 1982) are experienced prior to a binge eating episode.

It is evident that people with BN make certain statements to themselves in the early part of the binge that perpetuate the binge (Hsu, 1990). Four common themes are apparent: bad feelings ("I feel so bad") and self-condemnation; binge in order to vomit ("I won't gain weight because I'll just throw it up"); bewilderment over loss of control ("why can't I control this"); and ceasing the behaviour ("this is the last time") (Hsu, 1990, p.58). This research was supported by other results that indicated that prior to a binge cognitions related to negative thoughts about oneself (Cooper et al., 1998).

In addition to examining BN, studies have also considered pre-binge cognitions in BED. In a study of obese BED individuals, participants' thoughts prior to a binge were reported mostly to involve the intention to overeat, and were often defiant. Typical responses were statements such as "I can do this if I want to," and "This is my only vice and I'm entitled to it" (Arnow et al., 1992, pp. 163-164). The second most common thought that occurred prior to bingeing involved the hope of mood alteration. For example, "If I eat this food I will feel better" (Arnow et al., 1992, p. 164). In support of this, one third of BED participants in a study reported that an eating binge is intended to relieve negative feelings that precede the binge episode (Telch, Pratt, & Niego, 1998). Negative mood proceding binge eating was found in a study of overweight BED subjects (le Grange et al., 2001; Mitchell et al., 1999), and in a study of non-depressed women with BED (Greeno et al., 2000). When experiencing negative affect, there was a stronger desire to eat for people with BED (Dounchis, 2001). Additionally, a desire to binge eat, being at home and being alone (le Grange et al., 2001) were found to be precipitants of an eating binge.

Incongruent findings regarding lack of control over eating have been reported. Arnow et al. (1992) stated that thoughts regarding a lack of self-control reported before binge eating were rare in the obese population. However, Greeno et al. (2000) found that thoughts of lack of control over eating were associated with binge eating. It has been postulated that loss of control may only be experienced subsequent to the other precipitants of binge eating (Arnow et al., 1992).

It has been suggested that because these thoughts occur regarding the intention to overeat, some obese BED individuals, resentful of constantly engaging in a deprived eating regimen, may consciously decide, rather than feel compelled, to break their restricted diet and binge eat. Violation of food rules is reported to be a distinct precipitant to episodes of binge eating in a non-purging population (Arnow et al., 1992).

In summary, for BN individuals distorted cognitions have been reported to be significantly more distorted than those of non-eating disordered individuals prior to binge eating. Further, particular statements are common in individuals with BN at this time, and these cognitions appear to be involved in the initiation of the binge eating behaviour. Corresponding findings have been reported in individuals with BED, however, the cognitions that have been reported differ from those with BN.

7.5.2 Cognitions During the Binge

Surprisingly little research is available documenting cognitions at the time of a binge. It has been reported that permission-giving cognitions were activated and it was speculated that these cognitions might be important in

temporarily suppressing the salience of beliefs concerning the dangers of eating and weight gain. These thoughts also made it easier to binge, for example, "I deserve a reward", "It's OK to eat" (Cooper et al., 1998, p. 225). In support of this, binge eating is believed to provide relief from self-awareness and self-critical thoughts. Evidence for this is that during the binge reported dissatisfaction with body shape and weight decreases from high before the binge to moderate levels during the binge (Stickney et al., 1999).

In contrast to the previous findings, it was also reported that bingeing intensified automatic thoughts and images. These thoughts and images became more accessible, harder to ignore, and were accompanied by increased distress (Cooper et al., 1998). For overweight BED women, it has been reported that they are more likely to enjoy the binge food (Mitchell et al., 1999).

In summary, there has been very little research examining cognitions during the binge, and contradictory findings have been reported. It has been hypothesised that negative cognitions may be suppressed during the binge, and that the level of body dissatisfaction decreases. For example, prior to the binge rigid cognitions about food such as "non-diet food leads to immediate weight gain" (Phelan, 1987, p.599), have been identified. It would be expected that this type of cognition would have to be suppressed for binge eating to occur. The importance of examining cognitions during the binge is evident. Thoughts of enjoying the binge have also been reported in individuals with BED. However, the level of distress due to thoughts has also been found to increase.

7.5.3 Cognitions After the Binge

After a binge, BN participants were reported to more strongly endorse statements concerning feeling heavy and salient beliefs regarding food and weight than at baseline (Powell & Thelen, 1996). It was determined that after a binge bulimic subjects became angry with themselves and frightened, for example, "I'm out of control", "I'll get fat" (Cooper et al., 1998, p. 225). A sharp increase in negative mood has also been reported (Johnson & Larson, 1982; Powell & Thelen, 1996; Ruzumna, 1999).

In a population of obese people who engage in binge eating, it was found that after the binge cognitions involved self-criticism and self-blame. This was reported in 84 percent of all cases (Arnow et al., 1992).

In summary, an increase in negative cognitions has been consistently reported after a binge in individuals who engage in binge eating. Again, there is a limited amount of information regarding cognitions at this stage.

7.5.4 A Binge Compared to a Normal Meal

Further to changes across a binge eating episode, comparisons have been made between a binge eating episode and a normal meal. In contrast to a normal meal, BN participants endorsed more salient beliefs regarding food and weight and statements regarding feeling fat after a binge (Powell & Thelen, 1996). Although there may be a negative mood before a normal meal, it was found to be more intense before engaging in binge eating for the BN group (Davis et al., 1988; Lingswiler et al., 1989). It may be interpreted that increased levels of negative affect and dysfunctional cognitions after a binge are what cause the use

of a weight-control technique to prevent weight gain and relieve negative affect (Powell & Thelen, 1996).

When looking at antecedents to binge eating and normal eating in BED women, they were found to have lower levels of hunger and a greater desire to binge eat before the binge eating episode than in relation to a normal meal. They also had greater negative affect (le Grange et al., 2001).

In summary, individuals with BN report more distorted cognitions after a binge than a normal meal. For individuals with BED, cognitions differ between a normal meal and a binge meal. Again, there is a limited amount of research in this area, making it difficult to compare these eating situations.

7.6 METHODOLOGICAL ISSUES

It may be speculated that the environment in which the assessment of cognitions occurs may have an effect on the results obtained. The assessment of cognitions specific to binge eating has been conducted in the natural environment as well as in the laboratory setting. A study compared cognitions in BN, restrained eaters and non-eating disordered participants measured in a naturalistic setting and in a laboratory setting (Bonifazi & Crowther, 1996). Interestingly, it was found that these two settings had little (if any) effect on the ratings made by participants with BN. An implication of this finding is that results obtained from studies assessing cognitions of individuals with BN in a laboratory setting may be generalised to the naturalistic environment. However, it was found that cognitions of restrained eaters or non-eating disordered may not be accurately measured in the laboratory situation. Examination of the cognitions at the time that they occur may actually influence the content of the cognition. Studies of

self-monitoring indicate that behaviour may be changed merely by the act of self-monitoring (e.g., Pope & Jones, 1996). It may be better to allow the binge eating behaviour to occur naturally, and then retrospectively examine the cognitions associated with the binge.

Again, the definition used to describe the populations are not consistent, and different methodologies have been utilised for researching changes in cognitions across a binge eating episode. Studies to date have used similar methodologies as those for examining changes in emotions. Retrospective and real-time recording both have disadvantages and advantages as discussed in Chapter 6.

7.7 SUMMARY

In summary, both BN and BED appear to be associated with stronger endorsement of general cognitive distortions and those cognitive distortions specific to food, eating and body, than the general population. However, from the literature, it appears that individuals with BN have a greater degree of distortion than individuals with BED. Depression has also found to be allied with BN and BED. Although cognitive distortion is associated with depression, this does not appear to explain the level of cognitive distortion that is found in BN, and the specific cognitive distortions related to eating and diet in BED.

Although both BN and BED are associated with distorted cognitions, studies, which have examined changes across the binge episode, have reported that there are different cognitions associated with each of the disorders and a different pattern at separate stages. This indicates that although the bingeing

behaviour is the same, there are different factors initiating and maintaining the behaviour, which results in differences in the consequence of the behaviour.

CHAPTER 8

STUDY 1: SYMPTOMATOLOGY

8.1 INTRODUCTION

The demographics, eating symptomatology and general symptomatology of BN, BED, OW and NW groups are examined in this chapter. Chapter 2 provided a more detailed review of the literature in relation to the demographics of BN, BED and obesity. Further, comorbidity was also reviewed in that chapter. Chapter 4 provided a review of the behaviour associated with BN and BED. A brief summary of the information from Chapters 2 and 4 is provided below.

Binge behaviour is defined identically in the DSM-IV (APA, 1994) for both BN and BED. However, individuals with BED have been reported to differ in demographics from those with BN. BED tends to have a later age of onset than BN (e.g., Bulik et al., 1997; Spurrell et al., 1997), and individuals with BED are more likely to be obese (e.g., Rand & Kaldau, 1990).

BN has been has been found to have a high comorbidity with depressive and anxiety disorders (e.g., Garfinkel, Lin et al., 1995). Although individuals with BED have also been found to have some comorbidity with other disorders, it has been suggested that individuals with BN have higher levels of comorbidity (e.g., Crow et al., 1996; Prather & Williamson, 1988). Obese non-BED individuals have been found to have similar levels of comorbidity to that of the general community population (e.g., Molinari et al., 1997; Yanovski et al., 1993).

Eating symptomatology has been extensively examined in individuals with BN, and more recently in individuals with BED. The majority of studies have utilised the EDE (Fairburn & Cooper, 1993) and EDI (Garner, 1990) to measure eating symptomatology. The EDE has been found to be able to discriminate between BN, BED and obese non-BED individuals. In general,

individuals with BN have been reported to have higher levels of Restraint in comparison to individuals with BED (e.g., Marcus et al., 1992). Obese non-BED individuals have been found to report lower levels of Eating, Shape and Weight concern than BED individuals (e.g., Wilfley, Schwartz et al., 2000).

Results from the EDI indicate that individuals with BN have higher scores on all subscales than those with BED. The only exception has been the Body Dissatisfaction subscale, where individuals with BED have been found to rate higher than those with BN (e.g., Raymond et al., 1995). Individuals with BED have been found to have higher scores in general on the EDI than obese non-BED individuals (e.g., Fichter et al., 1993). There is evidence to suggest a continuity of eating disorder symptomatology for these groups.

The aim of the current study was to compare individuals with BN, BED, overweight non-BED and normal weight non-eating disordered controls on demographics, and measures of eating symptomatology and general symtomatology, to provide evidence for BED to be either an eating disturbance or an eating disorder.

A series of hypotheses was formulated on the basis of the previously presented literature review. It was hypothesised that the BED group would be older and heavier than the BN group. In terms of demographics, the BED group would be more similar to the OW group than the BN group. For eating symptomatology, the BN group would have the highest level, followed by the BED group, and then the overweight non-BED group. There would be distinct differences between the BED and BN groups and the BED and overweight non-BED groups. The normal weight non-eating disordered control group would have the lowest levels of symptomatology, indicating a continuum of

symptomatology. The BED group would be more similar to the BN group in terms of eating symptomatology. For general symptomatology, the BN group would have the highest level, followed by the BED group, with no differences between the overweight and normal weight groups. The BED group would be more similar to the BN group in relation to general symptomatology.

8.2 METHOD

8.2.1 Participants

Fifty-nine females participated in this investigation. They were divided into four groups. The first group consisted of females who, either currently suffered from BN purging type, or had a history of this disorder but did not currently meet the frequency criteria (n=7). Recruitment procedures failed to identify participants with BN nonpurging type. The DSM-IV (APA, 1994) states that symptoms of BN fluctuate, and that those individuals who do not currently meet the frequency criteria would be diagnosed with Eating Disorder Not Otherwise Specified (EDNOS). The participants who currently met the EDNOS diagnosis all reported a fluctuating course and all were still engaging in purging, but at a lower rate than that required for a diagnosis of BN. Given that the only criteria not met by some participants in this group was the frequency criteria, this group is referred to as a BN group throughout the study. The second group was comprised of females who currently had BED (n=19). Both of these groups were diagnosed using DSM-IV diagnostic criteria (APA, 1994). Diagnosis was based on clinical interview utilising the 12th Edition of the Eating Disorder Examination (EDE; Fairburn & Cooper, 1993). A further questionnaire was

developed to assess the criteria for BED. Information about both questionnaires are presented in the materials section.

The third and fourth groups contained females who did not have an eating disorder. The third group (n=17) consisted of overweight (OW) females (Body Mass Index (BMI; Keys et al., 1972) above 25.0). The fourth group (n=17) was comprised of normal weight (NW) females (BMI between 18.5 and 24.9), and acted as a control group. The OW and NW participants were selected on the basis that they did not have an eating disorder. Further, the OW group was weight-matched with the BED group, and the NW group was weight-matched with the BN group. An intensive design was adopted so those participants from this study also completed studies two, three and four.

Participants were from a variety of backgrounds. They were recruited through newspaper and radio advertisements and from the University psychology undergraduate program. The overweight and normal weight participants were selected from the University psychology undergraduate program on the basis of their weight to provide comparisons with the BED and BN groups, respectively.

The study received ethics approval from the University of Tasmania Human Research Ethics Committee. Information sheets were provided to all participants, and a statement of informed consent was signed before participation in the study. The information sheet and consent form are presented in Appendix A.

8.2.2 Materials

Eating Related Scales

The 12th edition of the Eating Disorder Examination (EDE; Fairburn & Cooper, 1993) is an investigator-based interview designed to measure the broad range of the specific pathology of eating disorders. The EDE measures participants' behaviour and attitudes over the previous 28 days. The interview provides five subscales: Restraint (measure of attempts to restrict food intake to influence shape and weight), Shape Concern, Weight Concern, Eating Concern and a Global Score. The EDE also assesses the frequency of behaviours such as binge eating and the use of different inappropriate compensatory behaviours. Previous studies have demonstrated that the EDE has good reliability and validity, and has been used in both descriptive studies and in research on treatment (Fairburn & Beglin, 1994).

The psychometrics of the EDE show that the scale has good internal consistency. In one study alpha coefficients ranged from 0.68 to 0.90 (Cooper et al., 1989) and from 0.68 to 0.78 in another (Beumont, Kopec-Schrader, & Touyz, 1993). Studies indicate that the EDE has good discriminant validity (Cooper et al., 1989; Wilson & Smith, 1989), and high inter-rater reliability (Cooper & Fairburn, 1987).

The EDI-II (Garner, 1990) is a 64-item self-report measure designed to assess psychological (cognitive) and behavioural characteristics common in AN and BN. The inventory consists of eight subscales: Drive for Thinness, Bulimia, Body Dissatisfaction, Ineffectiveness, Perfectionism, Interpersonal Distrust, Interoceptive Awareness, and Maturity Fears. These eight subscales are the same as those reported in the original inventory, published in 1983. The EDI

provisional subscales consist of 27 additional items that provide scores for three additional subscales: Asceticism, Impulse Regulation, and Social Insecurity.

Respondents rate whether each statement applies "always", "usually", "often", "sometimes", "rarely", or "never". Responses for each item are weighted from zero to three. A score of 3 is given to the most symptomatic response, followed by a score of 2, and then 1. The three least symptomatic responses are all given a score of 0.

The psychometrics of the EDI-II includes research examining the original scale because portions of the inventory remained unchanged with the introduction of the second edition. The scale has shown high internal consistency (coefficient alpha ranging from .83 to .92), good one-week test-retest reliability, with coefficients between .79 and .95 for all subscales except Interoceptive Awareness (.67) (Welch, 1988). The original subscales showed good validity, and the psychometric properties of the instrument have been shown to measure symptom domains that have clinical utility (Garner, 1990).

A short questionnaire was administered to assess the diagnostic criteria for BED (Binge Questionnaire, see Appendix B), based on the research criteria presented in the DSM-IV (APA, 1997). This questionnaire was only administered to participants who had been identified as having BN or BED, on the basis of the EDE interview. The OW and NW participants were identified by the EDE to not engage in binge eating. Therefore, the Binge Questionnaire was not administered to these groups, as they did not meet the binge eating diagnostic criterion A for BED (APA, 1997). Participants were asked to state whether or not binge eating was associated with certain characteristics, to ensure that a diagnosis of BED was met. These characteristics are those defined in the DSM-

IV for BED, and included items such as eating much more rapidly than usual, and eating large amounts of food when not feeling physically hungry.

General symptomatology

The Symptom-Checklist-90-Revised (SCL-90-R; Derogatis, 1994) consists of 90 items to assess a range of psychological symptoms. Each item is rated on a 5-point scale according to the amount of distress experienced in the last seven days including the day that the questionnaire is completed.

The SCL-90-R measures nine psychiatric symptom dimensions: Somatization, Obsessive-Compulsive, Interpersonal Sensitivity, Depression, Anxiety, Hostility, Phobic Anxiety, Paranoid Ideation, and Psychoticism. In addition, three global indices provide single scores of the nature and extent of the symptomatology. The Global Severity Index (GSI) is a single summary score of the current level of symptomatology that is derived by combining information regarding the number of items endorsed and the degree of distress experienced by the respondent. The Positive Symptom Distress Index (PSDI) provides a measure of the perceived distress that is independent from the number of items endorsed. The Positive Symptom Total (PST) provides a measure of the extent of symptomatology by scoring the number of items endorsed by the individual. Seven additional items that are excluded are not solely related to any of the seven primary symptom dimensions, but are included as they are clinically important (Derogatis, 1994).

The SCL-90-R has an internal consistency ranging between a low of 0.79 for Psychoticism to a high of 0.90 for Depression. It has good one-week test-retest reliability coefficients ranging between 0.76 and 0.85 and has been shown

to have good validity with similar scales such as the MMPI. For the data to be considered diagnostically, the notion of caseness, or that the data suggest a positive risk, is defined by a score equal to or above 63 on the GSI score, or on two or more of the primary symptom dimensions (Derogatis, 1994).

The Beck Depression Inventory II (BDI-II; Beck, Steer, & Brown, 1996) was used to assess the extent of depressive symptoms experienced by participants. The BDI-II is a 21-item self-report inventory. Participants are required to respond on a 3-point scale according to which statement of each group best describes how they have been feeling for the past two weeks, including the day that the questionnaire is completed. Scores between 0-13 indicate minimal depression, 14-19 mild depression, 20-28 moderate depression and scores between 29-63 have been interpreted as a reflection of moderate to severe depression (Beck et al., 1996).

Research has indicated that the BDI-II has a high internal consistency (coefficient alpha = 0.92), a good one-week test-retest reliability (0.93) and good validity and correlation with other measures of depression (Beck et al., 1996).

8.2.3 Procedure

Participants were provided with an information sheet about the study and were invited to ask any questions before the study commenced. A statement of informed consent was obtained after any questions had been answered. The EDE was administered in an interview session by the author, who is a registered psychologist. Group allocation was based on the results of the EDE, and for those participants found to have a diagnosis of BN or BED, the Binge Questionnaire was administered. The EDI-II was also completed at this time.

Current height and weight were measured, as part of the EDI-II and EDE, and from this, each participant's BMI was calculated. The participants were shown how to complete the BDI-II and SCL-90-R and were asked to complete these within a week from the initial interview. The questionnaires were returned when the participant attended for the next study.

8.2.4 Design and data analysis

The study compared four groups (BN, BED, NW, OW) on a range of different measures. Selection of the BN and BED groups was based on clinical diagnoses. Dependent variables were responses to the structured interviews and self-report inventories. One way analysis of variance (ANOVA) using SPSS were employed to analyse the data from the structured interviews and self-report inventories. Student-Newman-Keuls post hoc analyses, at the 0.05 level of significance, were used to examine between group differences where ANOVA produced a significant F value. A chi-square analysis was used to examine differences between groups on the Binge Questionnaire.

8.3 RESULTS

The results from the one way ANOVAs for Chapter 8 are presented in Appendix C.

8.3.1 Demographics

The means and standard deviations for age, weight and BMI for the four groups can be seen in Table 3.

Table 3.

Means and standard deviations for age, weight and BMI for the BN, BED, OW and NW groups.

	BN		BED		OW		NW	
	M	*SD*	*M*	*SD*	*M*	*SD*	*M*	*SD*
Age (years)	22.29	6.16	33.47	10.53	33.29	12.72	22.18	5.00
Weight (kg)	61.40	6.12	77.61	17.37	85.15	14.60	60.01	6.19
BMI	23.23	1.67	28.30	5.43	31.40	5.71	22.25	1.93

This data was analysed using a one-way ANOVA, with post hoc analysis, and the results of this can be seen in Table 4.

Table 4.

ANOVA and post hoc analyses results for comparisons between groups for age, weight and BMI.

	F value (df=3,56)	*MSE*	*p*	Differences
Age	6.45	600.14	0.001	BED, OW > BN, NW
Weight	12.96	2240.00	0.000	BED, OW > BN, NW
BMI	13.96	281.16	0.000	BED, OW > BN, NW

Post hoc analysis showed that the BED and OW groups were significantly older, heavier, and had a higher BMI than the BN and NW groups.

Information regarding dieting and binge eating were examined for the BN and BED groups. The means and standard deviations can be seen in Table 5.

Table 5.

Means and standard deviations for the age of first diet, first binge and regular binge eating for the BN and BED groups.

	BN		BED	
	M	*SD*	*M*	*SD*
First diet	15.43	1.51	17.06	5.89
First binge	16.00	1.83	16.42	5.57
Regular binge	17.00	1.92	18.84	5.97

ANOVA results indicated no significant differences between the two groups on any of these measures. However, from Table 5, it can be seen that the BED group has larger standard deviations than the BN group.

8.3.2 Binge Questionnaire

The Binge Questionnaire was only administered to the two clinical groups (BN and BED). The results from the Binge Questionnaire indicated that each participant in the BN and BED group reported that binge eating was associated with a minimum of four out of the five behaviours corresponding to the DSM-IV criteria for BED. The percentage of the BN and BED groups who associated binge eating with each of the behaviours can be seen in Table 6.

Table 6.

Percentage endorsed on the diagnostic questionnaire for the BN and BED groups.

Associated Behaviour	BN	BED
Eating more rapidly than normal	100	84
Eating until feeling uncomfortably full	100	100
Eating large amounts when not feeling physically hungry	86	100
Eating alone because of being embarrassed by how much you are eating	71	74
Feeling disgusted with oneself, depressed, or very guilty after overeating	100	100
Do you feel distressed about binge eating?	100	100

From Table 6, it can be seen that the entire BN group associated binge eating with eating more rapidly than usual, eating until uncomfortably full, and feeling disgusted, depressed or guilty after overeating. For the BED group, all participants associated binge eating with eating until uncomfortably full, eating large amounts when not physically hungry and feeling disgusted, depressed or guilty after overeating. All participants in both the BN and BED groups felt distressed about binge eating.

8.3.3 Eating Related Scales

EDE. The means and standard deviations for each group on the subscales of the EDE can be seen below in Table 7.

Table 7.

Means and standard deviations for the subscales of the EDE for the BN, BED, OW and NW groups.

	BN		BED		OW		NW	
	M	*SD*	*M*	*SD*	*M*	*SD*	*M*	*SD*
Restraint	3.54	1.26	2.32	1.47	1.27	1.65	0.49	0.58
Eating Concern	2.63	1.63	2.31	1.17	0.56	0.84	0.13	0.30
Weight Concern	4.36	1.17	2.95	1.15	1.51	1.35	0.54	0.72
Shape Concern	4.45	1.58	4.05	1.06	1.72	1.38	0.81	0.71

From Table 7, it can be seen that the BN group had the highest mean for each of the subscales, followed by the BED group, the OW group, with the NW group having the lowest mean. There were significant differences between groups on all of the subscales. ANOVA and post hoc results are presented in Table 8.

Table 8.

Significant results of the ANOVA and post hoc analyses for comparisons between groups for the subscales of the EDE.

	F value (df=3,56)	*MSE*	*p*	Differences
Restraint	11.20	19.55	0.000	BN > BED, OW, NW BED > NW
Eating Concern	22.16	20.95	0.000	BN, BED > OW, NW
Weight Concern	25.74	32.12	0.000	BN > BED > OW > NW
Shape Concern	33.19	43.75	0.000	BN, BED > OW, NW

Post hoc analysis results showed that for the Restraint subscale, the BN group rated significantly higher than the other three groups, and the BED group rated significantly higher than the NW group. For the Eating Concern and Shape Concern subscales, the BN and BED groups rated significantly higher than the OW and NW groups. On the Weight Concern subscale, there were significant differences between all the groups.

EDI-II. The raw scores were converted to standard scores using the Nonpatient College Female normative data. The means and standard deviations can be seen in Table 9.

Table 9.

Means and standard deviations for the subscales of the EDI-II for the BN, BED, OW and NW groups.

Subscale	BN		BED		OW		NW	
	M	*SD*	*M*	*SD*	*M*	*SD*	*M*	*SD*
Drive for thinness	94.43	8.26	79.22	15.21	47.24	24.39	34.24	16.86
Bulimia	83.00	18.97	86.50	12.38	59.00	12.71	55.88	13.30
Body Dissatisfaction	84.00	18.12	84.06	15.16	75.00	21.50	52.00	25.76
Ineffectiveness	83.00	16.18	85.17	13.24	63.82	19.17	58.41	14.46
Perfectionism	64.71	27.82	61.56	29.84	41.94	30.91	45.76	33.55
Interpersonal Distrust	71.43	26.60	69.67	17.39	55.29	22.15	60.12	24.15
Interoceptive Awareness	95.57	3.05	81.11	22.13	52.29	19.93	53.76	18.55
Maturity Fears	63.00	28.44	68.78	18.64	48.29	24.24	60.53	22.82
Asceticism	84.57	22.57	71.89	32.73	52.47	28.45	30.76	22.83
Impulse Regulation	73.86	21.92	74.83	22.17	52.77	16.91	53.35	18.37
Social Insecurity	70.14	24.57	78.00	24.18	49.06	31.66	51.88	27.91

There were significant differences between groups for the following subscales: Drive for Thinness, Bulimia, Body Dissatisfaction, Ineffectiveness, Interoceptive Awareness, Asceticism, and Impulse Regulation. ANOVA and post hoc results can be seen in Table 10.

Table 10.

Significant results of the ANOVA and post hoc analyses for comparisons between groups for the subscales of the EDI-II.

	F value (df=3,55)	*MSE*	*p*	Differences
Drive for Thinness	28.81	9641.56	0.000	BN > BED > OW, NW
Bulimia	20.71	3834.32	0.000	BN, BED > OW, NW
Body Dissatisfaction	8.12	3524.87	0.000	BN, BED, OW > NW
Ineffectiveness	10.90	2729.92	0.000	BN, BED > OW, NW
Interoceptive Awareness	14.44	5315.15	0.000	BN, BED > OW, NW
Asceticism	9.17	7098.69	0.000	BN > OW, NW BED > NW
Impulse Regulation	5.76	2222.67	0.002	BN, BED > OW, NW

Post hoc analyses showed that both the BN and BED groups had significantly higher scores than the OW and NW groups on the subscales Drive for Thinness, Bulimia, Ineffectiveness, Interoceptive Awareness, and Impulse Regulation. The BN, BED and OW groups all scored significantly higher than the NW group on the Body Dissatisfaction subscale. Additionally, the BN group scored significantly higher than the OW and NW, and the BED group scored significantly higher than the NW group on the Asceticism subscales. The only subscale where the BN group rated significantly higher than the BED group was on the Drive for Thinness subscale.

8.3.4 General Symptomatology

SCL-90-R. A comparison between the four groups was made on the standard scores, using the female non-patient normative data, on the nine symptom dimensions and the three global indices of the SCL-90-R. The means and standard deviations are presented in Table 11.

Table 11.

Means and standard deviations of the standard scores for the subscales of the SCL-90-R for the BN, BED, OW and NW groups.

Subscale	BN		BED		OW		NW	
	M	*SD*	*M*	*SD*	*M*	*SD*	*M*	*SD*
Somatisation	61.29	15.68	58.11	10.32	49.76	9.88	46.47	8.00
Obsessive-Compulsive	62.43	14.16	63.28	6.68	51.41	12.08	48.94	15.68
Interpersonal Sensitivity	71.71	8.32	62.72	10.91	52.18	13.67	51.76	10.90
Depression	65.00	6.71	61.61	9.94	51.53	13.01	49.29	10.45
Anxiety	67.00	11.52	58.56	11.94	48.71	12.49	46.65	8.58
Hostility	64.00	12.97	57.61	8.49	51.18	11.52	47.24	6.43
Phobic Anxiety	59.43	13.29	53.47	10.53	48.06	7.89	45.18	3.32
Paranoid Ideation	60.29	12.54	57.00	9.28	51.12	12.07	46.41	6.11
Psychoticism	60.71	17.15	61.83	9.61	52.06	11.00	51.00	8.09
GSI	67.86	9.77	62.22	9.35	49.88	15.37	47.94	12.94
PST	64.14	5.64	61.56	8.98	48.76	15.77	46.06	14.21
PSDI	63.86	9.48	59.61	7.22	50.29	10.94	43.65	7.47

Comparisons between groups were made. Significant differences between groups, and post hoc analyses are shown in Table 12.

Table 12.

Significant results of the ANOVA and post hoc analyses for comparisons between groups for the subscales of the SCL-90-R.

	F value (df=3,55)	*MSE*	*p*	Differences
Somatisation	5.77	616.39	0.002	BN, BED > OW, NW
Obsessive-Compulsive	6.81	813.14	0.001	BN, BED > OW, NW
Interpersonal Sensitivity	7.37	981.89	0.000	BN > OW, NW
Depression	6.37	742.17	0.001	BN, BED > OW, NW
Anxiety	7.77	974.08	0.000	BN, BED > OW, NW
Hostility	6.70	611.64	0.001	BN > OW, NW BED > NW
Phobic Anxiety	5.61	420.43	0.002	BN > OW, NW
Paranoid Ideation	4.98	483.41	0.004	BN >NW
GSI	7.29	1128.49	0.000	BN, BED > OW, NW
PST	6.86	1093.60	0.001	BN, BED > OW, NW
PSDI	13.96	1073.92	0.000	BN, BED > OW, NW

There were significant differences between groups on the subscales Somatisation, Obsessive-Compulsive, Interpersonal Sensitivity, Depression, Anxiety, Hostility, Phobic Anxiety, Paranoid Ideation, GSI, PST, and the PSDI

subscales. The post hoc analyses indicated that the BN and BED groups scored significantly higher than the OW and NW groups on the subscales Somatisation, Obsessive-Compulsive, Depression, Anxiety, GSI, PST and PSDI. The BN group scored significantly higher than the OW and NW groups on the subscales Interpersonal Sensitivity, Hostility, and Phobic Anxiety. The BED group scored significantly higher than the NW group on the subscale Hostility, and the BN group scored significantly higher than the NW group on the subscale Paranoid Ideation.

The BN group were the only group who had scores indicating clinical caseness (Derogatis, 1994), with the subscales: Interpersonal Sensitivity, Depression, Anxiety, Hostility, and the global indices: GST, PST, and PSDI all being 63 or above. The BED group did not reach clinical caseness, with only Obsessive-Compulsive subscale scoring 63 or above. None of the scores obtained by the OW and NW groups were above 63.

BDI-II. There was a significant difference between the groups on the BDI-II, $F(3,55) = 9.09$, $MSE = 638.40$, $p = 0.000$. The means and standard deviations can be seen in Table 13.

Table 13.

Means and standard deviations for the BDI-II for the BN, BED, OW and NW groups.

GROUP	*M*	*SD*
BN	20.57	10.68
BED	16.78	8.99
OW	7.53	9.07
NW	5.71	5.53

Post-hoc analyses showed that the BN and BED groups had a significantly higher score than the OW and NW groups. There was no significant difference between the BN and BED groups or the OW and NW groups.

The results placed the BN group in the moderate range of depression and the BED group in the mild range. Both the OW and NW groups were in the minimal range of depression.

8.4 DISCUSSION

The aim of the study was to determine whether BED is more similar to an eating disorder or eating disturbance. BED individuals were compared with individuals with BN, a non-BED overweight group and a normal weight non-eating disordered group, by examining demographics, and eating and general symptomatology.

Demographic differences were noted. An age difference was found, in that the BED and OW groups were older than the other groups. Support for this finding is evident in the literature (e.g., Brody et al., 1994; deZwaan et al., 1992; Rand & Kaldau, 1990; Ricca et al., 2000). For example, a number of authors have identified that individuals with BED are older than individuals with BN (e.g., Mussell et al., 1995; Spurrell et al., 1997). Research in the area of obesity has reported a more variable age of onset (O'Neil et al., 1981; Wing et al., 1985), however, it is not unexpected that the OW group is older than the NW group.

This indicates that, with regard to age, BN and BED are differentiated, whereas BED and the OW group are not significantly different. There is evidence in the literature to show that cognitive style differs across ages (e.g., DeFrias & Schaie, 2001; Kordacova & Kondas, 1998; Mazure & Maciejewski, 2003). Younger people may be more easily distressed than older individuals (e.g., Burckhardt, Clark, & Bennett, 2001; Jackson & Finney, 2002; Robinson et al., 2002; Sacker & Wiggins, 2002). Therefore, it may be that the differences found between the two groups in age may account for the diagnostic differences, in that the reaction to the eating disturbances and thoughts about their eating behaviours may reflect age-relevant responses. Differences in cognitive responses are examined in more detail in Chapter 11.

For the age difference between the NW and OW groups, it would not necessarily follow that the same argument could be presented. Normal weight and overweight were seen as variations of normal weight distribution. Therefore, the difference in age in these two groups would not be expected to influence psychological responding. The presence of psychological disturbance, such as an

eating disorder, would be needed to trigger the maladaptive psychological responses.

With regard to weight and BMI, the significant group differences were anticipated based on the definition of group membership. The BN group all engaged in purging behaviours to compensate for binge eating and, therefore, would be expected to be within the normal weight range. It would have been interesting to compare BN nonpurging type with the BED group, however, failure to identify and recruit any BN nonpurging participants did not allow for this comparison. This failure to identify nonpurging BN participants may have been due to the method of recruitment. Individuals were required to self-identify as having BN, which was subsequently confirmed by clinical interview. It may be that without the vomiting behaviour individuals were not identifying themselves as having BN, despite meeting all other diagnostic criteria.

The lack of difference between BED and OW groups on weight and BMI does not indicate diagnostic similarity. Clearly, there are two different styles of eating that leads to increased weight, one characterised by binge eating episodes and one characterised by more generalised overeating (Pincus & First, 1999). Further variables would need to be examined to determine diagnostic distinction between the two groups.

There were no differences between the BN and BED groups in terms of age of first diet, first binge, and the age at which binge eating became regular. The age of onset of dieting in the BN group was 15.43 years, which is similar to that reported by Raymond et al. (1995). The results for the BED group were consistent with that found by Spurrell et al. (1997). The BED group had large standard deviations for these, indicating a greater variability for onset in this

group in comparison to the BN group. Spurrell et al. (1997) divided the BED group into two groups, those who binged first and those who dieted. The age on onset for these two groups differed considerably (12 years versus 25 years of age, respectively), and therefore may explain the larger variation for the BED group.

The diagnostic criteria for BED clearly states the required characteristics for binge eating (APA, 1994). This degree of detail is not included in the diagnostic criteria for BN. However, the results of this study indicate that there are fundamentally no differences in the bingeing characteristics of BN and BED. It could be argued that BN and BED differ only on the basis that the BN group engages in compensatory behaviours. However, that is obviously not the case. The previous review of the literature has identified a multitude of associated variables on which the two groups differ.

Further, although the binge eating behaviour has been identified as being the same, it does not follow that the reaction to this similar behaviour will be identical. In areas outside of eating disturbances, it has been established that people respond differently to the same situations (e.g., Abrams & Ellis, 1994; Ellis, 1991, 1995). It may be the case that the BN and BED groups can be distinguished on the basis of their different reactions to the similar behaviour. Therefore, it is important to further consider the process of binge eating in these two groups.

When consideration was given to the results obtained from the administration of the EDE, it was evident that the BN and BED groups could be distinguished on the Restraint and Weight Concern subscales, but not the Eating Concern and Shape Concern subscales. High levels of restraint have been linked to BN in the literature (Laessle et al., 1989; Polivy & Herman, 1985; Ruderman

& Besbeas, 1992), so it is not surprising that the BN group in the current study had the highest level of restraint of all groups. The relatively lower level of restraint in the BED group from the current results has been reported by others (e.g., Marcus et al., 1992; Wilfley, Schwartz et al., 2000). The pattern of restraint and binge eating in the BN group is not observed in the BED group, therefore, despite the similarity in the bingeing behaviour, there appears to be fundamental differences in the pattern of binge eating. For example, the BN group binge eat in response to failure of restraint (e.g., Ardovini et al., 1999; Johnson et al., 1982), whereas the binge in the BED group is not directly related to restraint.

Further, despite the BED group being significantly heavier than the BN group, it was the BN group with the greatest Weight Concern. The combination of a desire for restraint, the failure of restraint resulting in binge eating and the over concern about weight may trigger compensatory behaviour in individuals with BN. In comparison, the BED group do not adopt compensatory behaviours and this may be a reflection of the fact that they are less concerned about restraint and weight.

The lack of differences between the BN and BED groups on the Eating Concern and Shape Concern subscales may be a reflection of the fact that these subscales are measuring factors that are more generally related to uncontrolled eating. Other researchers have reported similar findings (e.g., Striegel-Moore et al., 2001; Wilfley, Schwartz et al., 2000). However, when consideration is given to the interpretation that can be placed on Shape Concern, it could be argued that the Shape Concern of the BED group is more realistic given their higher weight than the Shape Concern of the BN group. In this sense, the BN group's higher

Shape Concern scores are more maladaptive or pathological than the concerns of the BED group.

The BED and OW groups did not differ on the basis of their restraint scores. This is consistent with the literature (e.g., Eldredge & Agras, 1996; Wilfley, Schwartz et al., 2000) and indicates that both groups place relatively less importance on dietary restraint. These two groups were distinguished on the basis of their Eating, Weight and Shape Concern subscale scores, with this finding being supported by previous research (e.g., Eldredge & Agras, 1996; Wilfley, Schwartz et al., 2000). It is not surprising that the eating concern of the BED group is greater than that of the OW group, given that the BED group had the more disturbed eating pattern. However, the higher scores for the BED group on Weight and Shape Concern are interesting given that the two groups were of similar weight. This indicates that the BED group members are distorted in their view of themselves, which is similar to the distortion observed when comparing normal weight BN with normal weight non-eating disordered controls (e.g., Wilfley, Schwartz et al., 2000). Concern about weight and shape in the absence of objective differences indicates eating disturbance.

The NW and OW groups did not differ in terms of their Restraint, Eating and Shape Concern, however, they did differ on the basis of their Weight Concern. This difference reflects a realistic acceptance of the greater weight of the overweight group. The lack of differences on Restraint, Eating and Shape Concern is a function of the absence of eating disturbance, suggesting that the OW and NW groups account for normal variation within the population.

It appears that the EDI-II does not distinguish between BN and BED as effectively as the EDE. This has been suggested by others (Fairburn & Beglin,

1994; Wilson & Smith, 1989) with criticisms being based on the EDI-II being developed to identify the characteristics of BN and AN. From the current study, the BN and BED groups were only distinguished on the Drive for Thinness subscale. This subscale has been linked with higher levels of restraint in individuals with BN, and is associated with an intense fear of weight gain and a strong desire to lose weight (Garner, Olmstead, & Polivy, 1983b), a relationship that is evident from the current results. The lack of concern generally by the BED group relative to the BN group about restraint and weight concern is consistent with the lower Drive for Thinness score indicating that BED is distinct from BN, with BN representing the more serious eating condition.

There was no significant difference between the BN and BED groups on the subscale Bulimia. Previous studies have reported that this subscale is best able to discriminate between individuals with BN and those with restrained eating (Wilson & Smith, 1989). However, the Bulimia subscale relates to the individual engaging in binge eating behaviour that may be followed by the impulse to engage in purging behaviour (Garner, Olmstead, & Polivy, 1983b). Given that the BED group engage in binge eating behaviour, it would be expected that they would score highly on some of the items associated with this subscale. Further, given the fact that the BN group in this study consisted of some individuals who did not meet the frequency criteria, the endorsement of these items may not have been as strong as that of a BN group that currently meet DSM-IV diagnostic criteria (APA, 1994).

When comparing the BED and OW groups on the EDI-II there was distinction between the two groups on the subscales Drive for Thinness, Bulimia, Ineffectiveness, Interoceptive Awareness and Impulse Regulation. These

findings are consistent with those of Barry et al. (2002) and Molinari et al. (1997). These subscales are clearly able to identify disturbed eating when comparing BED with eating in an overweight population. For example, the Impulse Regulation and Bulimia subscales relate to the binge eating behaviour, which is only evident in the BED group. In contrast, the Body Dissatisfaction and Asceticism subscales did not distinguish between the groups, which may be related to the fact that the groups are of similar weight. The Ineffectiveness subscale relates to feelings of worthlessness and insecurity (Garner et al., 1983), and these feelings have been reported to be a feature of BED when comparing obese BED and obese non-BED individuals (e.g., Dalle Grave, Todisco, Oliosi, & Marchi, 1996; Kuehnel & Wadden, 1994).

Interestingly, the OW and NW groups were only distinguished on the Body Dissatisfaction subscale. The OW group were comparable in their dissatisfaction with the BN and BED groups, probably as a reflection of their higher body weight relative to the NW group. The lack of any other difference between the OW and NW groups supports the proposition that the OW and NW groups are at the non-disturbed end of the eating continuum and do not experience significant eating disturbances.

When examining general symptomatology, the BN and BED groups were not statistically different on any of the subscales or global indices of the SCL-90-R. However, when consideration was given to the determination of caseness (Derogatis, 1994), it was only the BN group that experienced clinically significant symptoms. Statistically, the BED group had elevated levels of symptomatology compared to the NW and OW groups, which may account for previous findings of increased symptomatology relative to non-eating disordered

control groups (e.g., Marcus et al., 1990; Mussell et al., 1996; Wilfley, Schwartz et al., 2000). However, the level of symptomatology experienced by the BED group would be more manageable for the individual, and would not warrant psychological intervention. Again, this points to the fact that BN is the more serious of the two eating conditions.

The elevation of symptomatology scores for the BED group relative to the OW group provided evidence that the BED and OW groups are distinguishable by more than just the presence or absence of bingeing. This result is consistent with the results of previous studies (e.g., Pacheco, 1999; Yanovski et al., 1993) and provides support for the proposition that BED is an eating disorder, whereas being overweight is not.

In addition to general symptomatology, the BN and BED groups were not statistically distinguishable on the basis of BDI-II scores. However, as with the previous results, the BN and BED groups fell into different categories of clinical significance. The BN group experienced a moderate range of depression, whereas the depression experienced by the BED group was mild. Results, consistent with this finding have been reported in the literature (e.g., Crow et al., 1996; Prather & Williamson, 1988).

The BED group was distinguished from the OW group on the basis of BDI-II scored both statistically and clinically. There was little evidence of depression in the OW group and although the level of depression in the BED group was low, some depressive symptoms were evident. This provides further evidence in support of the proposition that the OW group is one characterised by little eating or other disturbance (e.g., Molinari et al., 1997; Wilfley, Schwartz et al., 2000; Zimmerman & Coryell, 1989).

In summary, this study provided evidence of distinct differences in some areas between individuals with BED and BN, and between BED and overweight individuals. As hypothesised, in terms of demographics, the BED group tended to be older and heavier than the BN group. This is consistent with other research findings. No differences in demographics were found between the BED and overweight groups. In terms of eating symptomatology, the EDE indicated a continuum of eating symptomatology, with the BN group having the highest levels, followed by the BED group, then the OW, with the NW group having the lowest levels. This is consistent with the findings of Dingemans, Bruna, and van Furth (2002) who reported that the severity of psychopathology of BED appears to fall between BN and obesity. Further, the Restraint and Weight Concern subscales differentiated between the BN and BED groups. The Eating and Shape Concern subscales differentiated between the BED and OW groups. The EDI was able to differentiate most clearly between the BED and OW groups, with the BED group having higher levels of symptomatology. This scale was not able to differentiate as well between the BN and BED groups. When considering general symptomatology, the BN and BED groups had higher levels of symptomatology than the OW and NW groups, which is consistent with the literature. The BN groups scores were more clinically elevated than the BED group, which is also supported by the literature.

These results support the premise that BED is more similar to an eating disorder, than an eating disturbance. In addition, the results also indicate that BED is a less severe form of eating disorder than BN.

CHAPTER 9

STUDY 2: PSYCHOPHYSIOLOGICAL RESPONSES TO BINGE EATING

9.1 INTRODUCTION

The subjective and objective psychophysiological responses with regard to binge eating are examined in this chapter. Chapter 7 provided a detailed review of the literature in this area. A brief summary of this is provided below.

There have been reports in the literature that subjective and objective changes in psychophysiological arousal have been associated with food related stimuli and the process of binge eating. The combination of both subjective and objective measures has been identified as important because of the complementary information provided by the two forms of assessment (Williamson et al., 1988).

When examining subjective psychophysiological states, the majority of research has focused on the process of binge eating. For both BN and BED, negative subjective psychophysiological states have been reported to precede binge eating, although the interpretation of these states may be different for these two groups (e.g., Abraham & Beumont, 1982; Hsu, 1990; Stickney et al., 1999). Interestingly, pleasant subjective psychophysiological states during binge eating have been reported only for the BED group, and not the BN group (Arnow et al., 1992).

When consideration has been given to objective psychophysiological states, research has focused on assessment of arousal upon exposure to food stimuli. In general, exposure to food has been reported to increase negative arousal states for BN and obese individuals who engage in binge eating (e.g., Drobes et al., 2001; Nuedeck et al., 2001; Voegele & Florin, 1997). It is noteworthy that binge eating following induction of negative mood resulted in a

reduction of arousal for individuals with BN because of the tension reducing properties of food for this group (Laberg et al., 1991).

There have been reported difficulties with methodologies that involve exposure to food, for example, the failure of test meal studies to elicit changes in psychophysiological arousal may be due to the dissimilarity between the quantity of food consumed and the nature of the circumstances surrounding the consumption and a real binge episode (Williamson et al., 1988). It is difficult to examine binge eating in a natural setting without substantially altering the behaviour or putting the individual at risk.

A preferred methodology would be one that allowed for the examination of psychophysiological arousal changes to binge eating in a controlled setting. Personlised, staged guided imagery has been proposed to be able to elicit accurate psychophysiological responses to memories of events of clinical interest (e.g., Haines, Williams, Brain, & Wilson, 1995; Haines, Williams, & Carson, 2002) including binge eating (Williams, Haines, & Brain, 1995).

The use of guided imagery as a means of accessing psychophysiological and psychological states was based on the propositions of Lang (1979) who postulated that imagery of behaviours is associated with measurable efferent outflow. The work of Pitman and colleagues (1987) in the area of trauma identified the superior nature of personalised imagery, that is, the recollection of events that have actually occurred for the individual, in eliciting psychophysiological responses that closely corresponded to imagery content. Personlised, staged guided imagery has been demonstrated to overcome deficits in imagery ability that have been detrimental to the examination of responses of

standard imagery, that is, imagery of events that have never been experienced (Brain, Haines, Williams, Stops, & Driscoll, 1996).

Personlised, staged guided imagery has been well established as a useful methodology for examining unique events, such as traumatic experience (e.g., Holmes, Williams, & Haines, 1998) or homicide (e.g., Glading, Williams, & Haines, 2001; Glading, Williams, Haines, & Sale, 2001; Haines, Williams, Sale, & Glading, 2001; Haines, Williams, Sale, Glading, & Davidson, 2002; Williams & Haines, 2001; Williams, Haines, & Casey, 2000; Williams, Haines, Sale, & Glading, 2001), or events that are logistically difficult or ethically improper to examine by any other means, such as self-mutilation (e.g., Brain, Haines, & Williams, 1998, 2002; Haines et al., 1995; Williams, Haines, & Sale, 2003).

An advantage of using personalised, staged guided imagery in examining the process of binge eating is that it allows for an examination of changes in psychophysiological and psychological response over the course of a binge event. The structured nature of personalised, staged guided imagery can facilitate the delineation of aspects of a behaviour that are of interest.

The aim of the current study was to investigate subjective and objective psychophysiological changes across a binge eating episode, a normal meal, and a neutral event. Each script is divided into five stages to allow for comparisons to be examined before, during and after the behaviours. Further, the aim was to compare differences between individuals with BED and BN, and between BED and non-BED overweight individuals.

On the basis of the literature review, the following hypotheses were formulated. It was hypothesised that for the subjective psychophysiological response, a negative state would precede binge eating for the BN and BED

groups, and for these two groups, the binge eating related script would have higher ratings of negative state than the normal eating and neutral scripts. There would be group by stage by script differences for the subjective reactions, reflecting variations in the way in which the groups responded to bingeing and overeating. The OW and NW groups would show increased subjective psychophysiological responses for the overeating script in comparison to the normal eating and neutral scripts, but the rate of increased responding would be lower than that of the BN and BED groups.

For the objective psychophysiological responses, it was hypothesised that for the BN and BED groups, there would be an increase in psychophysiological arousal across a binge eating episode. For the OW and NW groups, the objective psychophysiological responses would show less arousal than the BN and BED groups to the binge/overeating script.

The BED group would be more similar to the BN group, than the OW group, for both subjective and objective psychophysiological responses.

9.2 METHOD

9.2.1 Participants

The fifty-nine people who participated in the first study completed the present investigation.

9.2.2 Materials

Imagery Ability

The Betts QMI Vividness of Imagery Scale (Sheehan, 1967) was used to assess imagery ability. This is a 35-item questionnaire designed to measure the

ability to induce images in seven different modalities (visual, auditory, cutaneous, kinaesthetic, gustatory, olfactory, and organic). The questionnaire requires participants to rate the clarity of the image using a 7-point rating scale, which ranged from "no image present at all" (7) to "perfectly clear and vivid" (1). A lower score indicates superior imagery ability.

The questionnaire has been found to have good validity, demonstrated by high correlations obtained between scores on the test and the direct evocation of imagery. It also reliably differentiates participants in their capacity to image (Sheehan, 1967). The scale has good reliability (Juhasz, 1972) and test-retest reliabilities have been found to range for 0.72 to 0.75 (Westcott & Rosenstock, 1976), and in another study was found to be as high as 0.91 (Evans & Kamemoto, 1973). The scale has good internal consistency, with alpha coefficients ranging from 0.90 to 0.94 (Westcott & Rosenstock, 1976).

Imagery Scripts

The BN and BED participants were interviewed to collect information for personalised imagery scripts for three separate events: (a) a binge eating episode; (b) a normal eating episode; and (c) an emotionally neutral event which was not related to food (e.g., making a bed, washing hair). From the interview separate scripts were written for each of the three events. A binge eating episode was defined as a typical episode where the individual binge ate, and in the case of the BN group they reported that they had engaged in an inappropriate compensatory behaviour after the binge eating episode. This script focused solely on the binge eating behaviour, and did not include the subsequent inappropriate compensatory behaviour. The amount of food reported to be eaten

needed to be consistent with the definition of a binge. A normal eating episode was defined as a time where the individual ate a meal that consisted of the amount of food that would typically be consumed by a non-eating disordered individual, with no inappropriate compensatory behaviour for the BN group. The overweight and normal weight participants were interviewed for an overeating script rather than a binge eating script, as well as a normal eating and neutral script.

Participants were required to describe a specific instance of the behaviours occurring. Information that was incorporated into the scripts included the environment in which the behaviour occurred, the participant's behaviour, and their emotional, cognitive and psychophysiological reactions. The imagery scripts presented a chronological sequence of events, starting with the moments immediately preceding the event, the actual event, and the moments immediately following the event. Only elements recalled by the participant were included in the imagery scripts, in their expressed words. This ensured that each participant was not directed to experience reactions that they had not previously recalled.

Each imagery script was divided into five distinct stages: (1) setting the scene (a description of the physical environment in which the incident occurred and the context of the situation); (2) approach to the behaviour (an account of events immediately preceding the incident); (3) the incident (details of the actual behaviour); (4) the resolution (description of events immediately following the incident); and (5) the consequence (description of behaviour following the resolution). Information regarding the individuals' cognitions, emotions and

behaviours were included at each stage. An example of each script type is illustrated in Appendix D.

Subjective Psychophysiological Responses

Visual Analogue Scales (VASs) (McCormack, deHorne, & Sheather, 1988) were used to measure participants' subjective psychophysiological responses to imagery. The VASs were developed to typify subjective responses associated with bingeing behaviour. The scores (from 0 to 100) represented these responses on two bipolar dimensions: Relaxed/Tense, and Physically Comfortable/Physically Uncomfortable. Higher scores represented a more negative experience.

A further two VASs were included to measure the subjective clarity and content of each script. These bipolar dimensions were: Clear/Unclear and Very Close/Not Close. A higher score on these indicated a higher level of clarity and realism. A copy of the VASs is presented in Appendix E.

VASs were chosen as a form of assessment as it has been demonstrated that they place minimal cognitive demands on the respondent. In addition, VASs have been specifically designed to assess internal mood states (Stern, 2000). VASs have been utilised in studies examining pain and affect (e.g., Lingjaerde & Foreland, 1998; Tamiya et al., 2002) and have been reported to provide a reliable measurement, and are able to assess affective distress. Furthermore, McCormack et al. (1988) reported that in addition to being able to make multiple comparisons of responses by the same individual, VASs are able to reliably demonstrate within and between group comparisons.

Objective psychophysiological recording and Apparatus

Measurement of psychophysiological responses was recorded using Chart 3.5.1 on a Macintosh Powermac 7300/180 computer linked to a MacLab/8S Data Acquisition System. Recordings were made at a rate of 1mm per second, with a sampling frequency of 200 samples per second. Portable equipment was utilised when participants were unable to attend the University campus. An Acer TravelMate 514T computer and a 4 channel portable Powerlab using Chart 4.0.1 software was used.

Measurements were taken for finger blood volume (FBV), electrocardiograph (ECG) which was integrated to obtain a measure of heart rate (HR), and respiration (RESP). A range of psychophysiological measures were recorded to account for the idiosyncratic nature of response (Fleming & Baum, 1987).

FBV was measured via a plethysmograph attached to the second finger of the non-dominant hand. ECG was measured using the left rib-right rib placement, by use of 2 Kendall Meditrace 130 electrodes. One Kendall Meditrace 130 electrode placed at the right mastoid served as an earth reference. RESP was measured through a Pneumotrace respiration transducer fitted around the upper torso.

9.2.3 Procedure

An interview was conducted to obtain information for the imagery scripts. The interview process also included the administration of questionnaires for Study 1. This interview took approximately one hour and was recorded on

audiotape for the purpose of script construction. The Betts QMI Vividness of Imagery questionnaire was also administered.

The experimenter prepared imagery scripts in the intervening period between the interview and the laboratory session. At the laboratory session two experimenters were involved. The electrodes and other psychophysiological recording devices were fitted on the participant. One experimenter went into an adjacent room and was responsible for the psychophysiological recordings on the computer. The procedure for administering the scripts was described to the participant, and they were instructed to sit quietly with their eyes closed while a one-minute baseline of psychophysiological measures was recorded. Participants were required to keep their eyes closed during the presentation of scripts and were instructed to concentrate on imaging the details as they were being described. Stage one was presented immediately following the baseline, and there was a 10-second pause in between each of the stages during which the participant could open their eyes. Each stage was approximately 60 seconds in duration.

The laboratory session was the same when the portable equipment was utilised. The only exception was that the second experimenter remained in the same room, due to the set-up of the equipment.

Scripts were presented in a counter-balanced order to avoid order effects. After the presentation of each script, participants completed VASs, rating their subjective responses. A reminder of the main elements of each stage of each script was given to facilitate VAS completion. At the end of the session participants were given debriefing if required.

9.2.4 Transformation and Scoring of Psychophysiological Data

A 30 second pre-imagery baseline and a 30-second period of each stage was scored for every script. The scoring period was based on script content, and was usually 15-20 seconds into each stage. Although each script was individualised, the nature of their construction enabled scoring periods to be comparable. This scoring method has been successfully demonstrated in previous research (e.g., Brain et al., 1998, 2002; Haines et al., 1995, 2002; Wells, Haines, Williams, & Brain, 1997; Williams et al., 2003).

Mean responses were calculated for HR. Number of breaths per minute was counted for RESP. Change scores from baseline were calculated for FBV by subtracting the scores obtained during each stage from baseline.

9.2.5 Design and Analysis Strategy

The design of the study was a four (group: BN, BED, NW, and OW) by three (script: binge eating, normal eating, and neutral) by five (stages: setting the scene, approach, incident, resolution and consequence) mixed factorial design with repeated measures. Dependent variables were responses to the VASs and psychophysiological measures. The data was analysed by repeated measures ANOVA using SPSS. Due to the violation of the assumption of sphericity, a Huynh-Feldt correction was utilised (Maxwell & Delaney, 1989). Newman-Keuls post hoc analyses, at the 0.05 level of significance, were used to examine between group differences where ANOVA produced a significant F value. Post hoc analyses were performed using Statistica: Version Six, due to the repeated measures design.

9.3 RESULTS

The results from the repeated measures ANOVAs for Chapter 9 are presented in Appendix F.

9.3.1 Imagery

There were no significant differences between groups on imagery ability, as measured by the Betts QMI Vividness of Imagery Scale (Sheehan, 1967). All of the groups were within acceptable limits of imagery ability. The means and standard deviations are included in Appendix G.

There were no significant differences for the VAS clear/unclear, rating the clarity of the image of the script content. All of the mean responses of each stage at each script for the four groups were 76 or above, indicating that all scene presentations had a high level of clarity. The means and standard deviations can be seen in Appendix G.

There were no significant differences for the VAS very close/not close, rating how close was the script content to real life. All of the responses were 77 or above, for each stage of each script for the four groups, demonstrating that all groups rated each response as having a high level of realism. The means and standard deviations are presented in Appendix G.

9.3.2 Subjective Psychophysiological Responses

The VASs means and standard deviations for each group for each stage of each script are presented in Appendix H. There were no significant group by script by stage interactions for any of the subjective psychophysiological VASs, as was hypothesised.

Script x Stage Interactions

There was a significant script by stage interaction for the VAS physically comfortable/physically uncomfortable, $F(8,440) = 14.72$, $MSE = 7618.53$, $p = 0.000$, but there were no significant script by stage interactions for the other VAS, relaxed/tense. The significant interaction is presented in Figure 5.

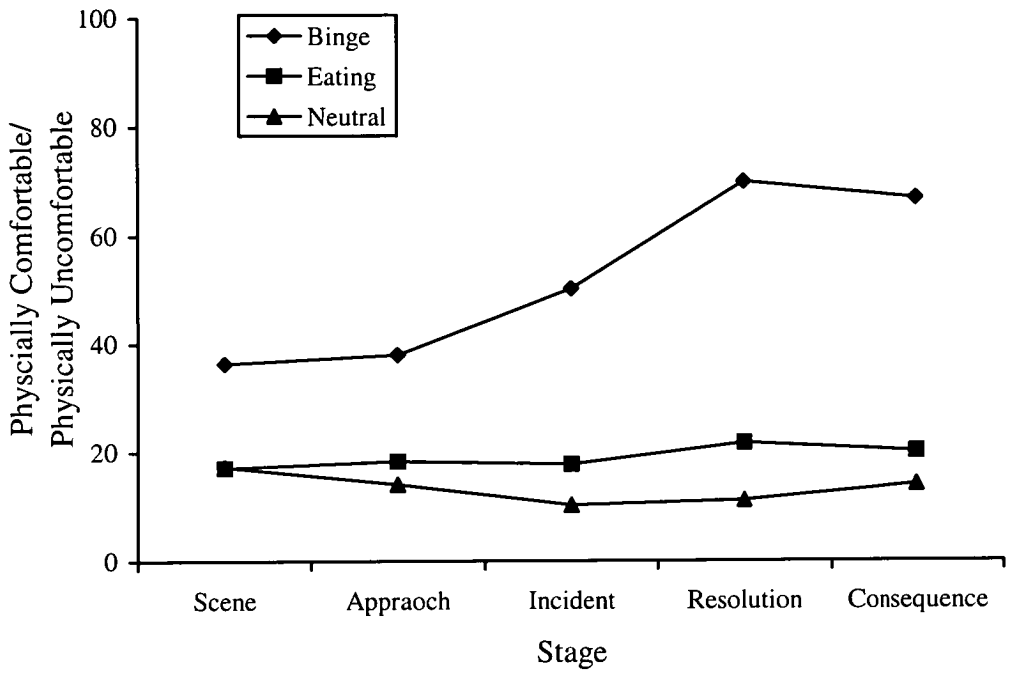

Figure 5. The mean ratings for the VAS physically comfortable/physically uncomfortable for the three scripts across each of the five stages.

The post hoc analysis shows that the binge eating related script was rated significantly more physically uncomfortable than the normal eating and neutral scripts for each of the five stages. Further, there were significant changes across the stages of the binge script, with ratings increasing significantly in level of discomfort from the approach to the incident, and from the incident to the

resolution and stages. There were no significant changes across the normal eating or the neutral script.

Script x Group Interactions

There were significant script by group interactions for the VASs relaxed/tense, $F(6,110) = 8.37$, $MSE = 8630.89$, $p = 0.000$ and physically comfortable/physically uncomfortable, $F(6,110) = 6.70$, $MSE = 6934.99$, $p = 0.000$. The relaxed/tense interaction is shown below in Figure 6.

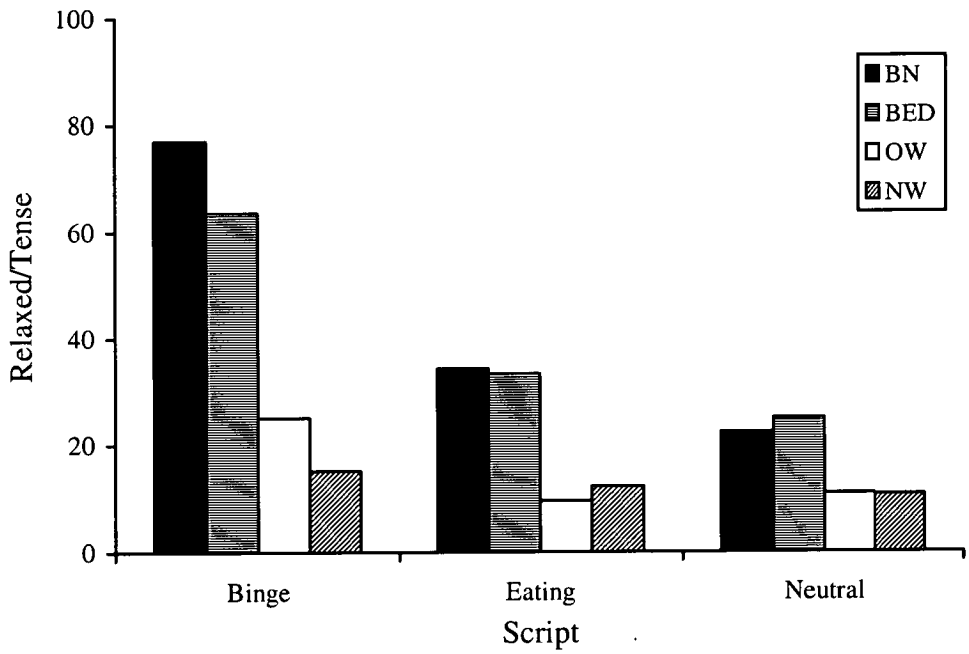

Figure 6. The mean ratings for the VAS relaxed/tense for each script for each of the four groups.

The BN and BED groups demonstrated a significantly more tension overall then OW and NW groups for the binge eating script. Further, the binge eating script was rated significantly more tense than the normal eating and neutral scripts for the BN and BED groups.

The interaction for the VAS physically comfortable/physically uncomfortable is presented in Figure 7.

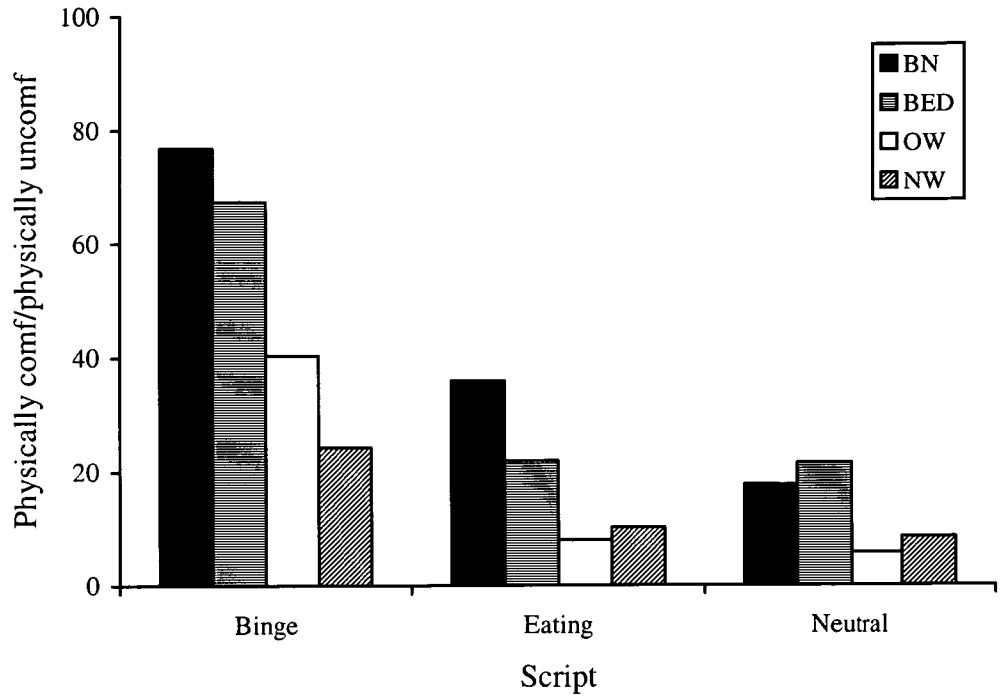

Figure 7. The mean ratings for the VAS physically comfortable/physically uncomfortable for each script for each of the four groups.

For the VAS physically comfortable/physically uncomfortable, post-hoc analysis shows that the BN and BED groups demonstrated a significantly higher physical discomfort than the OW and NW groups for the binge eating script. Additionally, the BN group had a significantly higher overall response than the OW and NW groups for the normal eating script. The binge eating related script was rated significantly higher in level of physical discomfort than the normal eating and neutral scripts for the BN, BED and OW groups. Further, the normal eating script was rated significantly higher than the neutral script for the BN group.

9.3.3 Objective Psychophysiological Responses

The objective psychophysiological response means and standard deviations for each group for each stage of each script are presented in Appendix H.

Respiration. There was a script by stage by group interaction for respiration, $F(24,400) = 1.61$, $MSE = 2.89$, $p = 0.035$. The means for each stage of the binge eating, normal eating and neutral scripts for the four groups are presented in Figure 8.

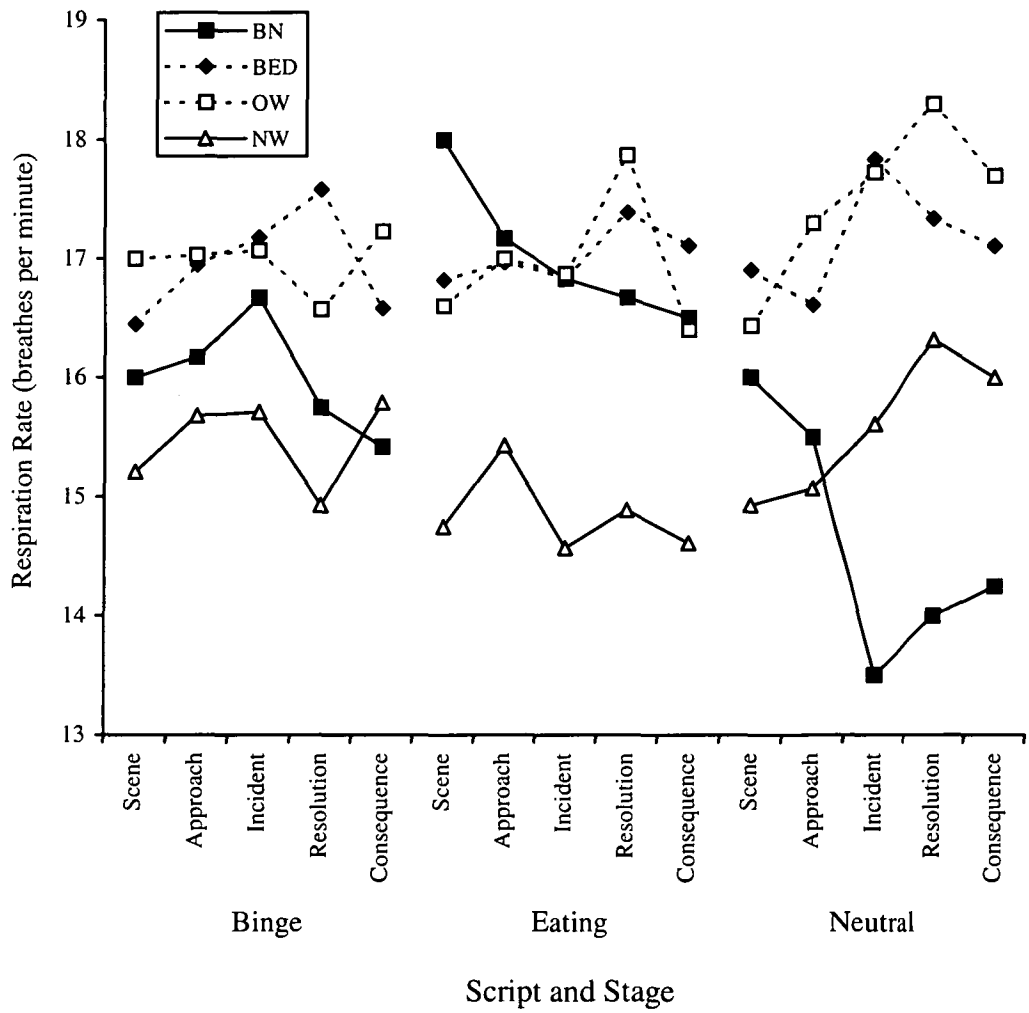

Figure 8. The mean ratings for respiration for each of the four groups at each stage of each script.

The post-hoc analysis shows that there were only significant differences for the BN group. The incident, resolution and consequence stages of the neutral script were significantly lower than incident stage for the binge eating script and all stages of the normal eating script. Further, the incident stage of the neutral script was significantly lower than the setting the scene, approach, resolution and consequence stages of the binge eating script, and the setting the scene and approach stages of the neutral script. The resolution and consequence stages of the binge eating script were significantly lower than the setting the scene stage of the normal eating script. Finally, the resolution stage of the neutral script was significantly lower than the approach stage of the binge eating script.

There was also a significant script by group interaction for respiration, $F(6,99) = 2.44$, $MSE = 20.44$, $p = 0.03$. Figure 9 presents this interaction.

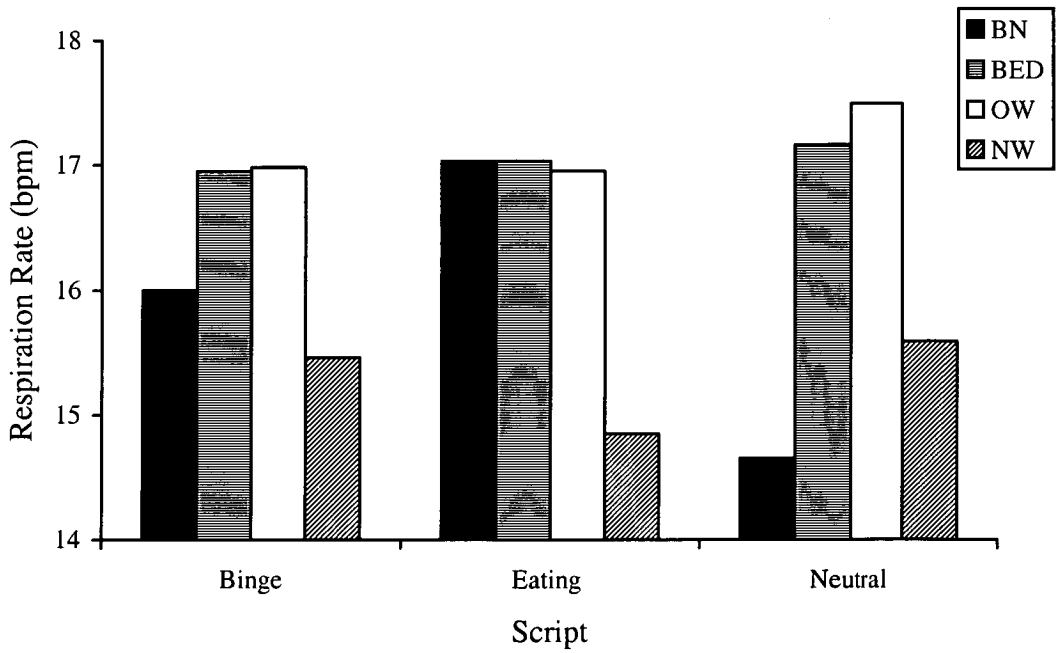

Figure 9. The mean ratings for respiration for each script for each of the four groups.

Post hoc analysis showed that for the BN group, respiration rate was significantly lower for the neutral script than the normal eating script.

Heart Rate. There was a trend for a main effect for script for heart rate, $F(2,6) = 2.79$, $MSE = 109.41$, $p = 0.066$. Mean heart rate was highest for the binge eating script, then the normal eating script, and lowest for the neutral script.

Finger Blood Volume. There were no significant differences for Finger Blood Volume.

9.4 DISCUSSION

It was hypothesised that there would be group by stage by script differences for the subjective responses, reflecting variations in the way in which the groups responded to bingeing and overeating. Interestingly, the pattern of response across the stages of the scripts was identical for all groups for physical discomfort. This implies that bingeing and over-eating both result in discomfort for all people engaging in the behaviours. For the BN and BED groups, it could be speculated that the gains obtained from overeating are greater than the discomfort experienced.

The subjective measures of psychophysiology indicated that for the binge eating and overeating scripts, discomfort significantly increased to a moderate level from the approach stage to the incident stage. This suggests that the discomfort that occurs with overeating is experienced during consumption, and this is earlier than expected. The elevated response to this VAS may be an

anticipatory response to the binge eating behaviour. A similar response has been reported in individuals with social phobia (Coles & Heimberg, 2000; Judd, 1994). An intense irrational fear in response to an anticipated situation has been observed in individuals with social phobia. It may be that individuals are aware that binge eating or overeating is going to occur, and anticipate the feelings associated with this. It would be important to consider whether anticipation regarding eating occurs at the cognitive level. This will be examined in detail in Chapter 11.

The degree of physical discomfort during binge eating was found to be at a moderate level. The majority of studies have reported that eating behaviour during a binge results in elevated responding for negative emotions (e.g., Arnow et al., 1992; Johnson & Larson, 1982; Mitchell et al., 1999). The increase in negative emotional response may be associated with the increase in physical discomfort. The emotional responses to binge eating are examined in Chapter 10.

Difficulties have been reported with the assessment of tension across a binge eating episode (Arnow et al., 1992). The results for tension in the current study were different to those reported for physical discomfort. It was evident that the BN and BED groups experienced more tension in response to binge eating than do the OW and NW groups in response to overeating. However, the level of tension across stages did not vary.

The BN and BED groups reported feeling tense prior to binge eating, during binge eating and after binge eating. This was despite the fact that the level of physical discomfort did change during the binge eating episode. In fact, elevated levels of tension preceded the development of physical discomfort,

suggesting little relationship between the two experiences. From the literature it has been found that changes in levels of anxiety occur across a binge eating episode (Hsu, 1990). This would indicate that changes in levels of tension would be expected. The relationship between tension and emotional responses, and tension and cognitive responses would need to be examined to provide an explanation for why tension does not vary across the binge eating episode. It may be that the elevated tension initiates the binge eating behaviour, but the act of binge eating does not lead to an amelioration of tension. There may be other benefits that are maintaining the binge eating behaviour, other than tension reduction, that negatively reinforce the behaviour.

When examining the script by stage interactions for the level of physical discomfort and tension, there was no evidence that differences existed between the BN and BED groups or the BED and OW groups. However, further examination of the results provided information to suggest distinctions between these groups.

There were group differences in the overall intensity of physical discomfort and tension. The BN and BED groups both reported more negative subjective responses in comparison with the OW and NW groups for the binge eating script. This suggests a similarity between the BN and BED groups and a distinction between the BED and OW groups.

It could be argued that the BN and BED groups ate more during their binge than the OW and NW groups ate during their overeating episode. This information was not recorded in this study. However, there is evidence that the size of the binge is not as relevant as would be expected. The literature has indicated that a subjective binge that is characterised by a smaller amount of food

or number of calories consumed can be associated with the same psychological responses as an objective binge that is characterised by consumption of a large amount of food or calories (Pratt et al., 1998). It may be that elevated levels of tension, and the perception of intense feelings of physical discomfort are a reflection of the psychological disturbance that accompanies disordered eating, in comparison to being a physical manifestation due to overeating.

When examining responses to normal eating behaviour, it was interesting to note that the BN group experienced relatively more physical discomfort in response to a normal meal than the OW and NW groups. It would be expected that an individual's relationship with food is going to be disturbed if they have an eating disorder. The results would suggest that the disturbed relationship with food is greater for the BN group, certainly in comparison with the OW and NW groups. In contrast, the BED group's relationship with food appears less disturbed, but not significantly so.

On the more objective measures of the response to binge eating, there was a significant three way interaction for respiration. The important point from this result is that the response to binge eating and eating a normal meal is the same for all groups. Psychophysiologically, there is no evidence of the hyperarousal that you would expect to indicate physical distress or psychological distress. However, there is a trend for heart rate to be elevated in response to the binge eating script, which would be expected due to the amount of food consumed and the increased psychological distress.

The BN and BED groups do not appear to be reacting to physiological events. Therefore, if they respond differently on an emotional and cognitive level, these responses are not being triggered by intense physiological arousal.

Alternatively, if emotional and cognitive differences exist, the BN and BED groups may be over responding to what can be considered a normal elevation in heart rate in reaction to overeating. In support of this, Karhunen and colleagues (1997) concluded from their study on obese binge eating and obese non-binge eating individuals, that subjective characteristics appear to distinguish the two groups. There were no differences between these two groups on physiological cephalic phase measures taken during food exposure or eating a test meal.

In summary, the objective psychophysiological results indicate no clear distinction between BN and BED or BED and OW groups. However, there does appear to be some evidence of a distinction between BED and OW groups on the basis of their subjective psychophysiological responses to binge or over eating. The subjective psychophysiological results indicate that the BED group is more similar to BN than the OW group. This implies that individuals with BED respond to both binge eating and normal eating in a way that is consistent of an eating disorder, rather than an eating disturbance. Consistent with the findings of Chapter 8, the BN group appears to be a more severe eating disorder than BED.

CHAPTER 10

STUDY 3: EMOTIONAL RESPONSES TO BINGE EATING

10.1 INTRODUCTION

The results from study 2 indicated that in terms of subjective psychophysiological arousal, BN and BED were significantly different from the OW and NW groups in response to the binge eating related script. The BN and BED groups also demonstrated a greater differentiation between the binge eating script from the normal eating and neutral scripts. As well as examining psychophysiological changes in terms of binge eating, emotional responses also need to be considered. This study examines the emotional responses of BN, BED, OW and NW groups.

The environment in which the individual is eating and the emotional state of the individual have been found to influence eating. The risk of binge eating has been found to increase when the individual is alone, in their own home (e.g., deZwaan et al., 1992; Engstroem & Norring, 2001; Schlundt, Johnson, & Jarrell, 1985). In addition, eating in the presence of others has been reported to increase the amount of food consumed, irrespective of whether the meal is eaten with family, friends, or strangers (Clendenen, Herman, & Polivy, 1994; de Castro, 1994; Patel & Schlundt, 2001). Confederate studies have demonstrated that eating behaviour is influenced by others, resulting in changes in the amount of food consumed (e.g., Mori, Chaiken, & Pliner, 1987; Pliner & Chaiken, 1990).

Emotional states have been reported to affect eating behaviour. Eating when feeling bored has been a common research finding (e.g., Abramson & Stinson, 1977; Hill, Weaver, & Blundell, 1991; Wilson, 1986), particularly for individuals with BN symptoms or those who engage in binge eating (Hohlstein, Smith, & Atlas, 1998; Lacey et al., 1986; Simmons, 1998; Simmons, Smith, & Hill, 2002; Stickney et al., 1999). Higuchi and Fukada (2002) reported factors

such as being apprehensive about social evaluation and a loss of self-esteem to be associated with embarrassment. These factors may also result in a change of behaviour when consuming food.

In addition to general emotional response to eating situations and eating during an emotional state, the emotional response specific to individuals with BN and BED has been examined. This includes emotional responses to food in general, and to changes in emotional response across an episode of binge eating. The literature examining the emotional responses of individuals with BN and BED was reviewed in Chapter 6. This information has been summarised below.

Binge eating in individuals with BN and BED has been postulated as a method for reducing aversive negative emotional states. Negative mood has also been reported to precipitate binge eating in both BN and BED (e.g., Arnow et al., 1992; Lingswiler et al., 1989; Stickney et al., 1999). As well as negative emotions being associated with binge eating in disordered eating groups, eating in obese individuals has been associated with negative emotional states (e.g., Gelibter & Aversa, 2003).

In general, individuals with BN and BED respond with more negative emotions than non-eating disordered controls (e.g., Greeno et al., 2000; Johnson & Larson, 1982). As previously mentioned, negative mood has been found to be associated with eating in both BN and BED sufferers (e.g., Lingswiler et al., 1989), however, individuals with BED have also reported some positive emotions in relation to binge eating (e.g., Mitchell et al., 1999).

The motivation for engaging in binge eating behaviour appears to differ for the BN and BED groups (e.g., Arnow et al., 1992; Rossotto et al., 1996). For

individuals with BN motivation appears to be related to a sense of control, whereas for those with BED the motivation is linked to a negative view of self.

Emotional state appears to influence eating in obese individuals (e.g., Gelibter & Aversa, 2003; Tuomisto et al., 1998). However, obese individuals have been found to be less reactive to emotional state in terms of eating behaviour than individuals with disordered eating (e.g., Kenardy et al., 1996).

There is evidence that emotional state varies across a binge eating episode and does not remain stable. Depressed mood (e.g., Costanzo et al., 1999; Mitchell et al., 1999), anxiety (e.g., Beebe, 1994; Powell & Thelen, 1996), anger (e.g., Hsu, 1990; Kenardy et al., 1996) and boredom (e.g., Hsu, 1990; Stickney et al., 1999) have been found to be common emotional states preceding a binge eating episode.

During the binge eating episode contrasting emotional responses have been reported for individuals with BN, with both decreases (e.g., Abraham & Beumont, 1982) and increases (e.g., Johnson & Larson, 1982) in negative mood found in the literature. These inconsistencies may be due to differences in methodology and definition of the stages. Individuals with BED have reported some pleasure associated with binge eating (e.g., Arnow et al., 1992), but also some increase in negative emotions (e.g., Mitchell et al., 1999). The emotional responses of BN and BED during a binge appear to differ.

After the binge eating episode, emotional response by the BN group is influenced by the ability to induce vomiting (Abraham & Beumont, 1982). However, initially, the emotional response is negative following the consumption of food (e.g., Elmore & de Castro, 1990; Powell & Thelen, 1996). Individuals with BED tend to respond with guilt after binge eating (e.g., Kenardy et al.,

1996). It is evident that the emotional responding of individuals with BN and BED changes across the binge eating episode.

A limitation with the research examining changes in mood across a binge eating episode is the methodology utilised. Studies have used retrospective recording (e.g., Arnow et al., 1992; Mitchell et al., 1999) and real-time recording (Greeno et al., 2000; Lingswiler et al., 1989; Stickney et al., 1999). However, both of methodologies have disadvantages. The use of guided imagery offers an alternative approach for examining changes across a discrete event, and has been used to examine a number of unique events, such as traumatic experience (e.g., Holmes et al., 2001) or homicide (e.g., Williams & Haines, 2001; Williams et al., 2000;), or events that are logistically difficult or ethically improper to examine by any other means, such as self-mutilation (e.g., Brain et al., 1998, 2002; Haines et al., 1995). The rational for the use of guided imagery was provided in more detail in Chapter 9.

The aim of this study is to assess general emotional responding for BN, BED, OW and NW groups. Furthermore, the aim is to assess changes in emotional state across a binge episode, a normal meal and a neutral event.

A series of hypotheses was formulated on the basis of the previously presented literature review. It was hypothesised that situations and the emotional state in which eating occurs would have a greater negative impact on endorsed emotional responses for the BN and BED groups in comparison to the OW and NW groups. Further, eating in social situations will result in elevated negative responses for the BN and BED groups compared to eating alone. Eating when feeling bored and upset will result in more elevated emotional responses then eating when feeling tired and happy for the BN and BED groups.

When examining the emotional responses to binge eating and normal eating, it is hypothesised that the BN group will have the highest level of general negative emotional states, followed by the BED group. There will be few differences between the OW and NW groups, with their responses being lower than the BN and BED groups. The BN and BED group will endorse negative emotional states more strongly in relation to the binge eating script, compared to the normal eating and neutral scripts. The intensity of emotional states will change across the binge eating episode for the BN and BED groups, with the strongest negative emotional state occurring at the resolution stage. The OW and NW groups will respond with lower ratings of negative emotions than the BN and BED groups. For the OW and NW groups, the overeating script will be associated with increased negative emotional responses than the normal eating and neutral scripts, however, the level of responding will be relatively low. It is further hypothesised that the BED group will show more negative emotional responses than the OW group to the binge/overeating script, and that the responses will be more similar to the BN group.

10.2 METHOD

10.2.1 Participants

The 59 people who participated in the first study completed the present investigation.

10.2.2 Materials

Stimulus Response Inventory

A Stimulus Response Inventory (SRI) was included to investigate differences between groups in emotional response to normal eating in various situations. The Stimulus-Response Inventory for Anxiousness (Endler, Hunt, & Rosenstein, 1962) was modified to make it relevant to eating scenarios. The questionnaire required participants to rate how much they feel a particular emotion using a 4-point rating scale, which ranged from "not at all" (1) to "very much" (4). A higher score indicated a stronger negative emotion. A copy of the SRI can be seen in Appendix I.

SRIs have been shown to provide reliable and valid measures for a range of situations (e.g., Krohne et al., 2000; Vleeming, 1981). Individuals with BN have been reported to have a problematic relationship with food in general (e.g., Greeno et al., 2000), whereas this has not been as evident for individuals with BED. Therefore, the SRI will be utilised to examine responses to normal eating in a variety of situations.

Emotional Responses

Visual Analogue Scales (VASs) (McCormack et al., 1988) were used to measure participants' psychological response to imagery. The VASs were developed to typify subjective responses associated with bingeing behaviour. The scores (from 0 to 100) represented these responses on three bipolar dimensions: Happy/Sad, Untroubled/Guilty, and Unafraid/Afraid. Higher scores represented a more negative experience. A copy of the VASs can be seen in Appendix J.

Imagery Scripts

The imagery scripts were the same scripts as those utilised in Chapter 9. An example of each script type is illustrated in Appendix D.

10.2.3 Procedure

The interview procedure to obtain information for the imagery scripts was the same as for Chapter 9. Participants completed the VASs for emotional responses during the laboratory session where psychophysiological recordings were taken. The emotion VASs were completed at the end of each script. A detailed description of imagery scripts and presentation is provided in Chapter 9.

10.2.4 Design and Analysis Strategy

The design of the study was a four (group: BN, BED, OW, and NW) by three (script: binge eating, normal eating, and neutral) by five (stages: setting the scene, approach, incident, resolution and consequence) mixed factorial design with repeated measures. Dependent variables were responses to the VASs. The VAS data were analysed using a repeated measures ANOVA using SPSS. Due to the violation of the assumption of equal variance, a Huynh-Feldt correction was utilised (Maxwell & Delaney, 1989).

For the SRI, one way ANOVAs were performed to examine differences between groups for each emotional response for the different eating situations. Further, the eating situations eating alone at home, eating in front of family and friends, and eating in public were compared, as they examine three different environments where individuals may engage in eating behaviour. When comparing the emotional responses, the responses for 'hunger' and 'in control'

were excluded, as they are terms specifically related to food, in comparison to the other more general emotional states. The emotional responses (excluding hunger and in control) were compared across these situations, using a 3 (situations) by 6 (emotions) by 4 (groups) repeated measures ANOVA. The eating situations eating when feeling bored, eating when feeling upset, eating when feeling tired and eating when feeling happy were compared, as they examine four different emotional states that may occur when individuals engage in eating. The emotional responses (excluding hunger and in control) were compared across these situations, using a 4 (situations) by 6 (emotions) by 4 (groups) repeated measures ANOVA.

Newman-Keuls post hoc analyses, at the 0.05 level of significance, were used to examine between group differences where ANOVA produced a significant F value. Post hoc analyses were performed using Statistica: V6, due to the repeated measures design.

10.3 RESULTS

The results from the one way and repeated measures ANOVAs for Chapter 10 are presented in Appendix K.

10.3.1 Stimulus Response Inventory

The means and standard deviations for each group on all eating situations can be seen in Appendix L. One-way ANOVAs were used to examine differences between groups for each emotional response for the different eating situations. The analysis results are presented in Table 14.

Table 14.

Results comparing the four groups on each emotion for the different eating situations.

Situation	Response	*F*(3,55)	*MSE*	*p*
Eating alone at home	Embarrassed	1.99	0.34	ns
	Anxious	6.11	5.89	0.01
	Distressed	3.51	3.14	0.02
	Disgusted	4.90	5.74	0.004
	Guilty	5.16	6.51	0.003
	Hungry	0.85	1.02	ns
	In Control	10.48	13.90	0.000
	Sad	3.89	4.53	0.014
Eating in front of family and friends	Embarrassed	10.14	6.90	0.000
	Anxious	15.54	10.85	0.000
	Distressed	9.13	6.49	0.000
	Disgusted	9.56	6.24	0.000
	Guilty	15.28	11.24	0.000
	Hungry	0.58	0.74	ns
	In Control	12.84	10.50	0.000
	Sad	8.40	4.67	0.000
Eating in public	Embarrassed	9.26	10.83	0.000
	Anxious	9.85	10.25	0.000
	Distressed	5.43	5.70	0.002
	Disgusted	3.46	3.51	0.022

(table continues)

Table 14. *(continued)*

	Guilty	6.44	7.36	0.001
	Hungry	0.07	0.10	ns
	In Control	8.56	9.52	0.000
	Sad	3.43	3.39	0.023
Eating when feeling bored	Embarrassed	10.16	8.56	0.000
	Anxious	13.35	14.06	0.000
	Distressed	9.02	10.57	0.000
	Disgusted	10.08	14.04	0.000
	Guilty	5.23	7.12	0.003
	Hungry	2.90	3.54	0.043
	In Control	4.32	6.46	0.008
	Sad	14.15	12.76	0.000
Eating when feeling upset	Embarrassed	6.27	7.95	0.001
	Anxious	16.29	19.01	0.000
	Distressed	18.14	15.74	0.000
	Disgusted	19.04	26.28	0.000
	Guilty	14.86	20.44	0.000
	Hungry	2.58	2.96	ns
	In Control	9.63	12.00	0.000
	Sad	6.14	11.29	0.001
Eating when feeling tired	Embarrassed	7.49	3.05	0.000
	Anxious	8.32	6.12	0.000
	Distressed	5.67	4.17	0.002
	Disgusted	6.13	7.18	0.001

(table continues)

Table 14. *(continued)*

	Guilty	7.93	11.50	0.000
	Hungry	1.39	2.30	ns
	In Control	4.05	6.26	0.011
	Sad	4.32	3.86	0.008
Eating when feeling happy	Embarrassed	9.52	1.93	0.000
	Anxious	6.57	3.17	0.001
	Distressed	3.56	1.89	0.02
	Disgusted	6.43	3.02	0.001
	Guilty	8.63	7.01	0.000
	Hungry	0.96	1.52	ns
	In Control	5.04	6.11	0.004
	Sad	3.39	1.61	0.024

In summary, from Table 14, it can be seen that differences between groups on the majority of emotional responses in different eating situations were significant. The only emotional response in which there was consistently no difference between groups across the different eating situations was for the response of feeling hungry, with the exception of eating when feeling bored. Post hoc analyses were conducted to find differences between groups. In general, the differences showed that the BN and BED groups endorsed stronger negative emotions than the NW and OW groups across all settings. The results below consider the different eating situations individually.

Eating when alone at home. For the situation, eating when alone at home, there was a significant difference between groups for their responses on the following emotions: anxious, distressed, disgusted, guilty, in control and sad. The means are presented in Figure 10.

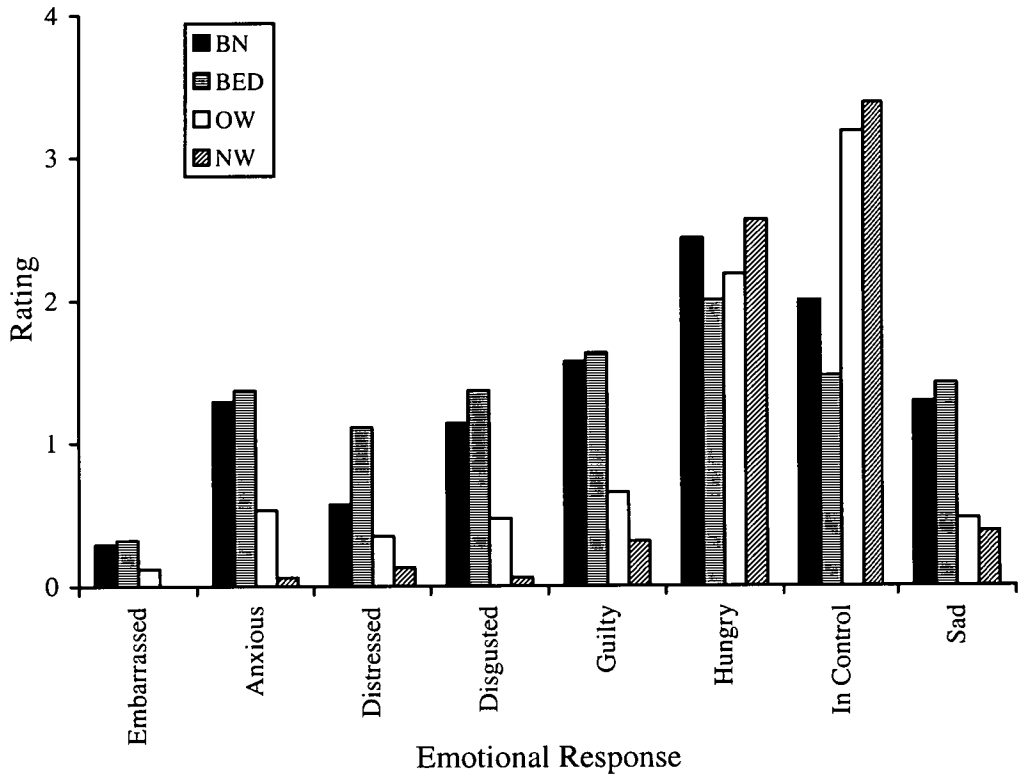

Figure 10. The mean ratings for each emotional response for all four groups for the situation eating alone at home.

Post hoc analyses showed that the BN and BED groups rated significantly higher than the NW group on the emotional responses anxious, distressed, disgusted, guilty and sad. Additionally, the NW and OW groups rated significantly higher levels of feeling in control than the BN and BED groups.

Eating in front of your family or friends. When comparing the four groups on their responses to the situation of eating in front of your family and friends, there were significant differences on the emotional responses of

embarrassed, anxious, distressed, disgusted, guilty, in control and sad. The means can be seen in Figure 11.

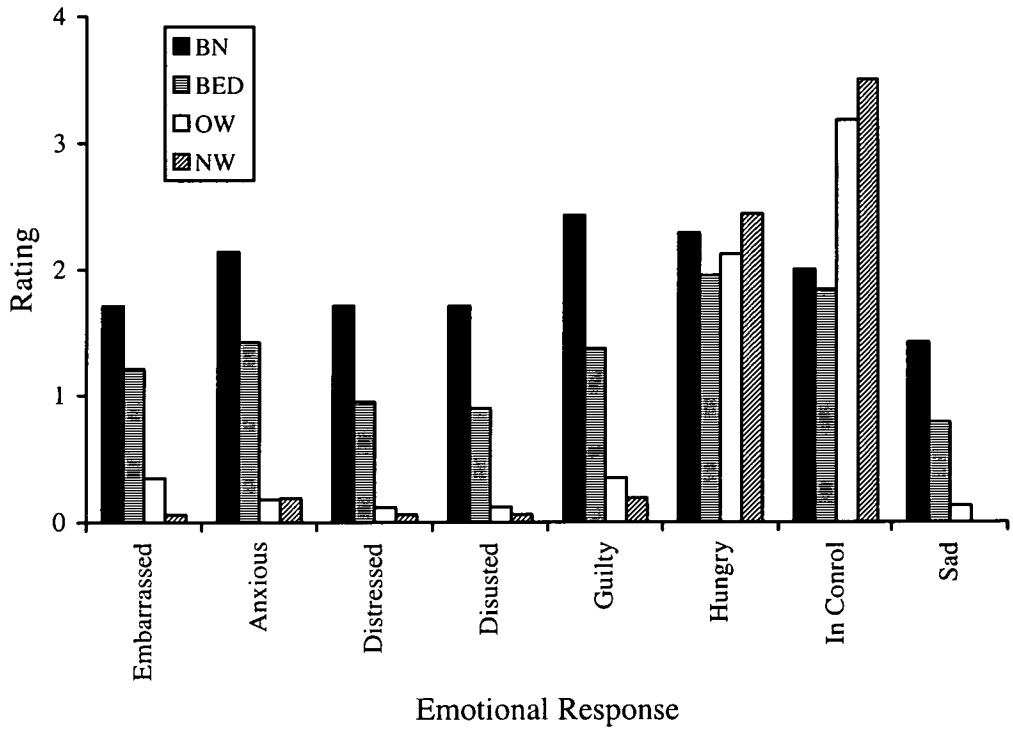

Figure 11. The mean ratings for each emotional response for all four groups for the situation eating in front of family and friends.

Post hoc analyses shows that the BN and BED groups rated significantly higher than the NW and OW groups on the emotional responses embarrassed and significantly lower on the response in control. Further, the BN group rated significantly higher than the BED group, and the BN and BED groups were significantly higher than the NW and OW groups on the responses anxious, distressed, disgusted, guilty and sad.

Eating in public. When comparing the four groups on their responses to the situation of eating in public, there were significant differences on the

emotional responses of embarrassed, anxious, distressed, disgusted, guilty, in control and sad. The means are presented in Figure 12.

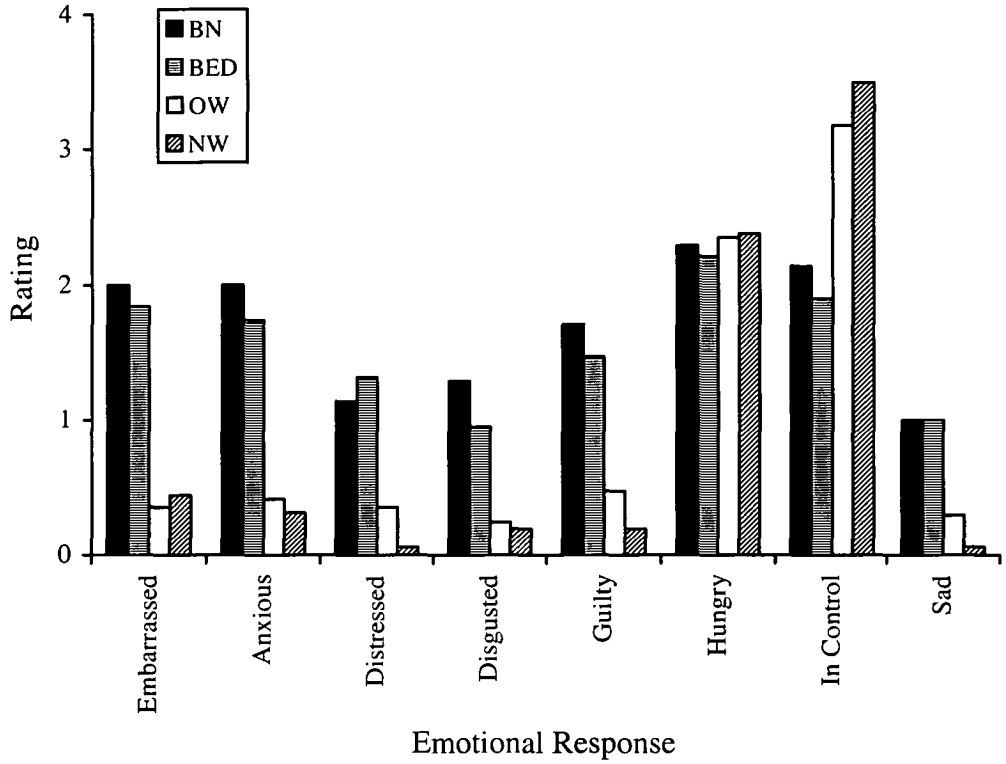

Figure 12. The mean ratings for each emotional response for all four groups for the situation eating in public.

From the post hoc analyses, it can be seen that the BN and BED groups scored significantly higher than the NW and OW groups on the emotional responses embarrassed, anxious and guilty, and significantly lower on the response in control. In addition, the BN and BED groups were significantly higher than the NW group on the response distressed, and the BN group was significantly higher than the NW and OW groups on the emotional responses disgusted.

Eating when feeling bored. When comparing the four groups on their responses to the situation of eating when feeling bored, there were significant differences for all the emotional responses. The means are presented in Figure 13.

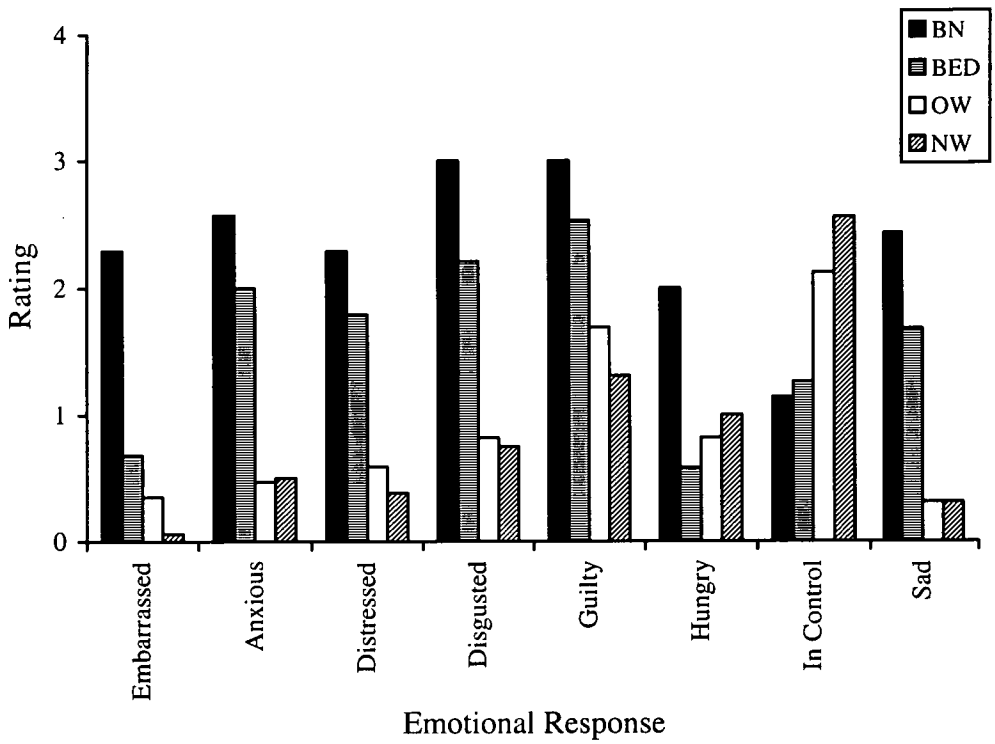

Figure 13. The mean ratings for each emotional response for all four groups for the situation eating when feeling bored.

Post hoc analyses showed that the BN and BED groups rated significantly higher than the NW and OW groups on the emotional responses anxious, distressed, disgusted and sad. The BN group rated significantly higher than all three groups on the response embarrassed and hungry. For the response in control, the NW group rated significantly higher than the BN and BED group. Finally, for the emotional response guilty, the BN and BED groups rated

significantly higher than the NW group and the BN group rated significantly higher than the OW group.

Eating when feeling upset. When comparing the four groups on their responses to the situation of eating when feeling upset, there were significant differences on the emotional responses of embarrassed, anxious, distressed, disgusted, guilty, in control and sad. The means are presented in Figure 14.

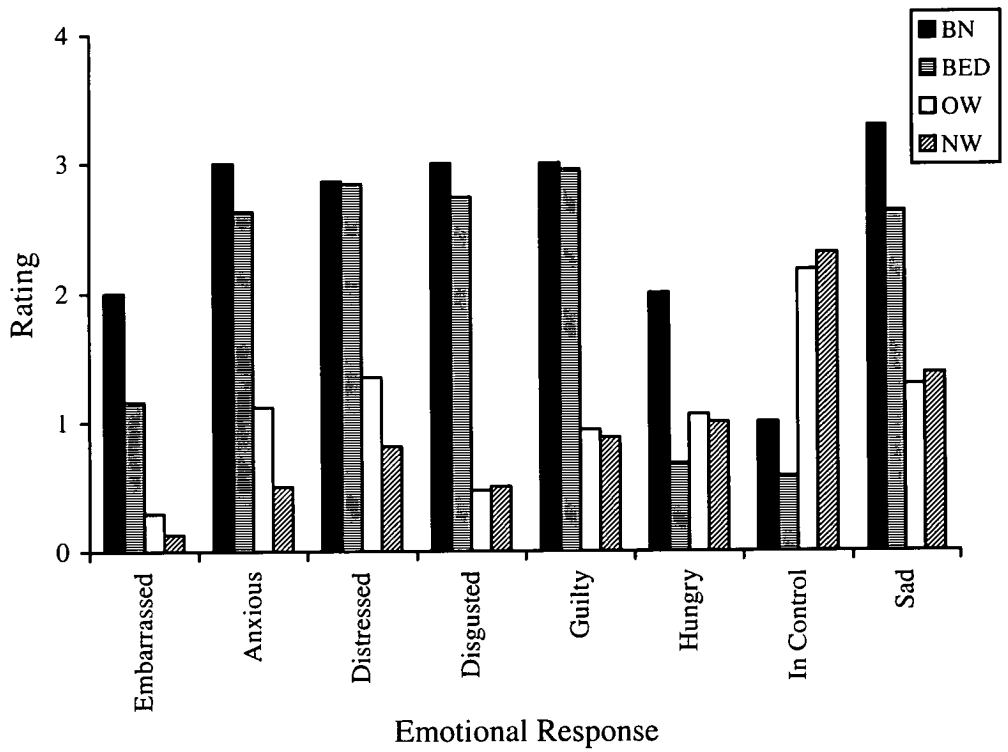

Figure 14. The mean ratings for each emotional response for all four groups for the situation eating when feeling upset.

From the post hoc analyses it can be seen that the BN and BED groups rated significantly higher than the NW and OW groups on the responses anxious, distressed, disgusted, guilty and sad, and significantly lower on the response in control. Additionally, the BN group rated significantly higher than the NW and OW groups on the response embarrassed.

Eating when feeling tired. When comparing the four groups on their responses to the situation of eating when feeling tired, there were significant differences on the emotional responses of embarrassed, anxious, distressed, disgusted, guilty, in control and sad. The means are presented in Figure 15.

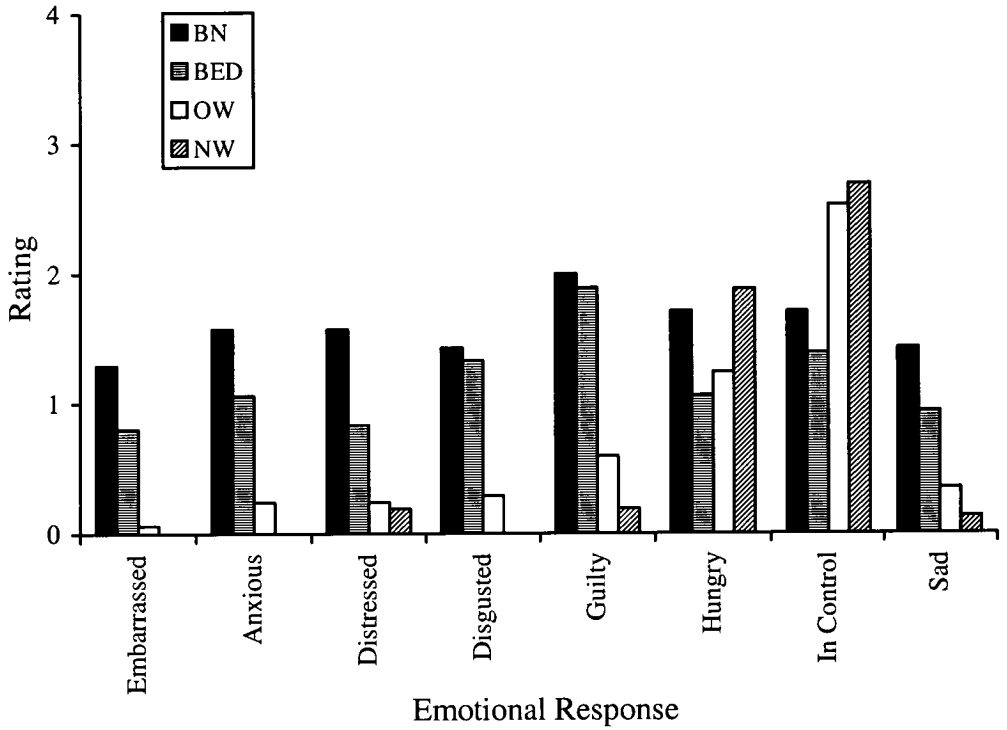

Figure 15. The mean ratings for each emotional response for all four groups for the situation eating when tired.

From the post hoc analysis it can be seen that the BN and BED groups rated significantly more negative than the NW and OW groups on the responses anxious, disgusted and guilty. On the embarrassed and distressed responses the BN group responded significantly higher than all the other groups. The BED group rated feeling significantly less in control than the NW and OW groups. Finally, the BN group rated feeling significantly more sad than the NW and OW groups.

Eating when feeling happy. When comparing the four groups on their responses to the situation of eating when feeling happy, there were significant differences on the emotional responses of embarrassed, anxious, distressed, disgusted, guilty, in control and sad. The mean responses are presented in Figure 16.

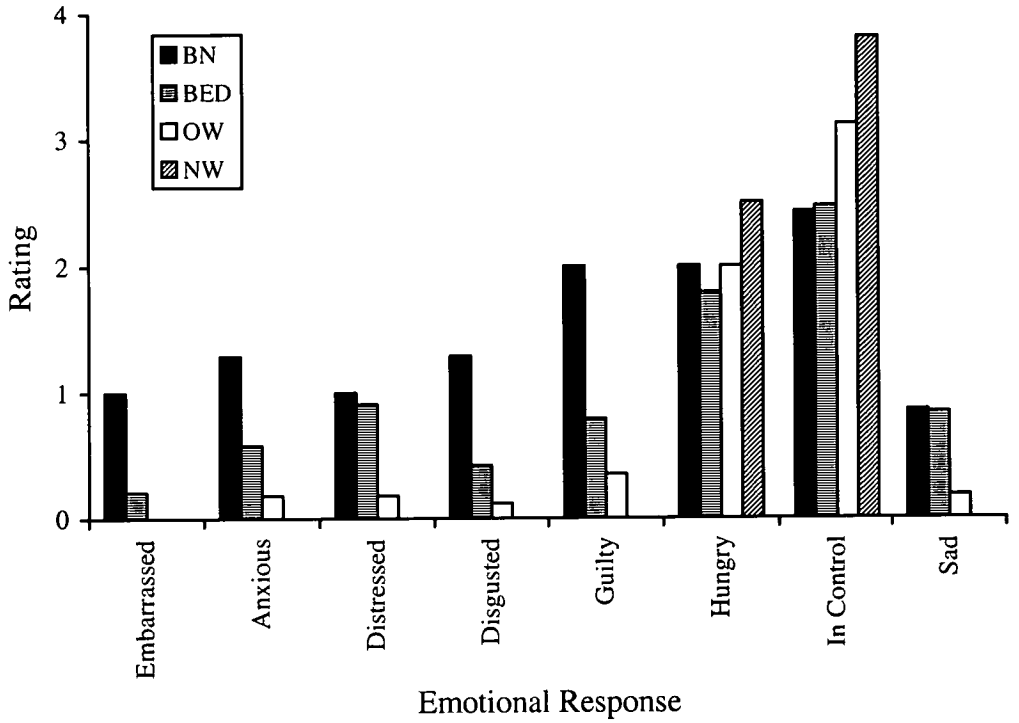

Figure 16. The mean ratings for each emotional response for all four groups for the situation eating when feeling happy.

Post hoc analyses shows that the BN group rated significantly higher than the NW and OW groups on the responses distressed and sad. Additionally, the BN group rated significantly higher than all three groups on the responses embarrassed, anxious, disgusted and guilty. Finally, the NW group rated significantly higher levels of feeling in control than both the BN and BED groups.

Comparison of Environments. The eating situations eating alone at home, eating in front of family and friends, and eating in public were compared. There was a significant group by environment by reaction interaction, $F(23.5, 431.1) = 2.01$, $MSE = 0.59$, $p = 0.004$. This can be seen diagrammatically in Figure 17.

Figure 17. The mean ratings for each emotional response for the situations eating alone at home, eating in front of family and friends and eating in public for the four groups.

From Figure 17, the BN and BED groups rating consistently higher than the NW and OW groups. Post hoc analyses were performed to examine significant differences between groups and across emotions. When looking at each group individually for each eating situation, there were only significant

differences for the BN and BED groups. The results for these two groups can be seen below in Table 15.

Table 15.

Post hoc analyses comparing differences in emotional response for each group for each eating situation.

Situation	Group	Significant Differences
Eating Alone at Home	BN	Anxious, disgusted, guilty, sad > embarrassed Anxious, guilty, sad > distressed
	BED	Anxious, disgusted, distressed, guilty, sad > embarrassed
Eating in front of family and friends	BN	Guilty>embarrassed, distressed, disgusted, sad Anxious>sad
	BED	ns
Eating in public	BN	Embarrassed, anxious >distressed, disgusted, sad Guilty>sad
	BED	Embarrassed, anxious>disgusted, sad

From Table 15, for the situation eating alone at home, embarrassed was rated significantly lower than anxiety, disgusted, guilty and sad for both the BN and BED groups. For the BED group, embarrassed was also rated significantly lower than distressed. For the BN group, distressed was rated significantly lower than anxious, guilty and sad. The situation eating in front of family and friends, there were only significant differences for the BN group. Guilt was rated significantly higher than embarrassed, distressed, disgusted and sad. Further, anxiety was rated higher than sad. The situation, eating in public, embarrassed

and anxious were rated significantly higher than disgusted and sad for both the BN and BED groups, and additionally, higher than disgusted and sad for the BN group. The BN group also rated higher levels of guilt than sadness.

The emotions were compared across the different eating situations for the different groups. Post hoc analyses showing significant differences can be seen in Table 16.

Table 16.

Post hoc analyses comparing emotional responses between groups across three eating situations.

Emotion	Significant Differences	
Embarrassed	BN Eating in Public >	BN, BED, OW, NW Eating Alone OW, NW Eating with Family
	BED Eating in Public >	BN, BED, OW, NW Eating Alone NW Eating with Family
	BN Eating with Family >	BN, BED, OW, NW Eating Alone
	BED Eating with Family >	BN, BED, OW, NW Eating Alone
Anxious	BN Eating with Family>	BN, OW, NW Eating Alone OW, NW Eating in Public
	BN Eating in Public>	BN, OW, NW Eating Alone OW, NW Eating in Public
Distressed	BN Eating with Family >	BN Eating Alone
Disgusted	ns	
Guilty	BN Eating with Family >	BN, OW, NW Eating Alone BN, OW, NW Eating in Public
Sad	ns	

From Table 16, it can be seen that for the emotion embarrassed, the BN group rated the situation eating in public higher than the BN, BED, OW and NW groups for the situation eating alone at home, and higher than the OW and NW groups for the situation eating in front of family and friends. Additionally, the BED group rated the situation eating in public higher than the BN, BED, OW and NW groups for the situation eating alone at home, and higher than the NW group for the situation eating in front of family and friends for the emotional response embarrassed. Finally, the BN and BED groups both rated the situation eating in front of family and friends as more embarrassing than the BN, BED, OW and NW groups for the situation eating alone. For the emotion anxious, the BN group rated their response for the situation eating in front of family and friends significantly higher than the BN, OW and NW groups for the situation eating alone at home, and higher than the OW and NW groups for the situation eating in public. Further, the BN group rated their response for the situation eating in public higher than the BN, OW and NW groups for the situation eating alone at home, and higher than the OW and NW groups for the situation eating in public. For the emotional response distressed, the BN group rated the situation eating in front of family and friends higher than the situation eating alone at home. The BN group rated their response for the emotion guilty for the situation eating in front of family and friends higher than the BN, OW and NW groups for the situation eating in public and eating alone at home.

Comparison of Emotionally Laden Situations. The eating situations eating when feeling bored, upset, tired and happy, are four different emotional states where individuals may engage in eating behaviour. There was a significant group by eating situation by emotional response interaction,

$F(34.4,595.8) = 1.82$, $MSE = 0.70$, $p = 0.003$. This can be seen diagrammatically in Figure 18.

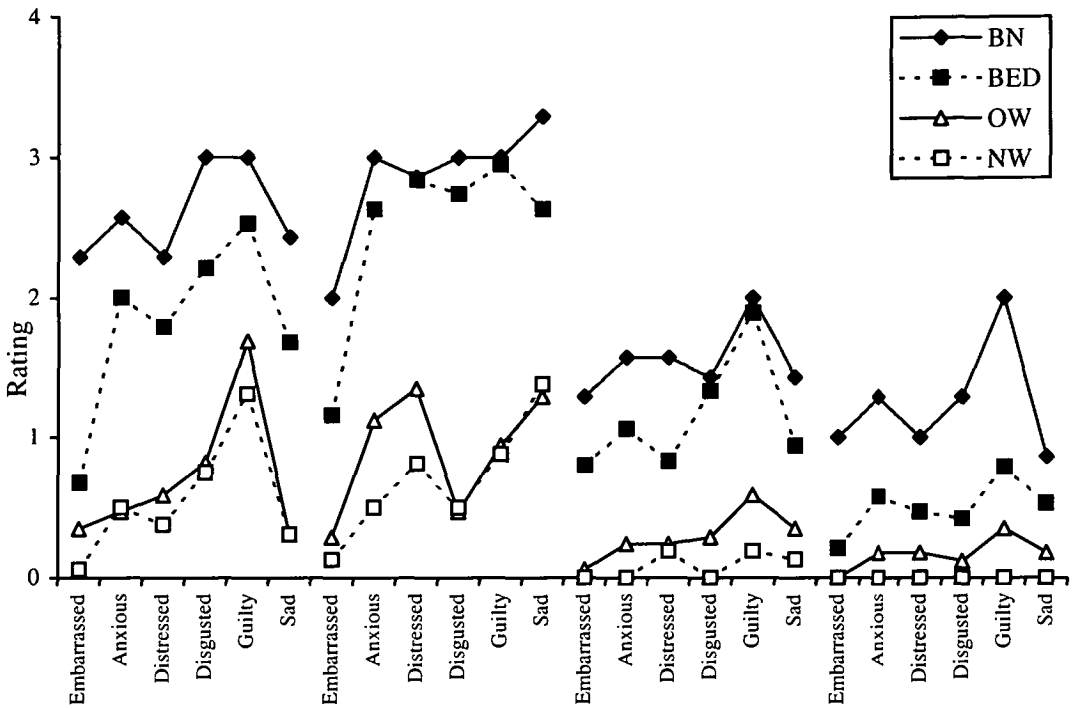

Figure 18. The mean ratings for each emotional response for the situations eating when feeling bored, eating when feeling upset, eating when feeling tired and eating when feeling happy for the four groups.

From Figure 18, it can be seen that the eating situations eating when feeling bored and eating when feeling upset generally had more elevated ratings, indicating a more negative emotional state, than the situations eating when feeling tired and eating when feeling happy. Post hoc analyses were performed to look at significant differences between groups and across emotions. The results for each group can be seen below in Table 17.

Table 17.

The post hoc differences between emotions for each group for the different eating situations.

Situation	Group	Significant Differences
Eating when bored	BN	Disgusted>distressed
	BED	Anxious, distressed, disgusted, guilty, sad>embarrassed Guilty> distressed, sad
	OW	Guilty>embarrassed, anxious, distressed, sad
	NW	Guilty>embarrassed, anxious, distressed, sad
Eating when upset	BN	Anxious, distressed, disgusted, guilty, sad>embarrassed
	BED	Anxious, distressed, disgusted, guilty, sad>embarrassed
	OW	Distressed>embarrassed, disgusted
	NW	Sad>embarrassed, anxious, disgusted
Eating when tired	BN	ns
	BED	Guilty>embarrassed, sad Disgusted>embarrassed
	OW	ns
	NW	ns
Eating when happy	BN	Guilty>embarrassed, distressed, sad
	BED	ns
	OW	ns
	NW	ns

From Table 17, it can be seen that there were more significant differences in levels of emotion rated by each group for the situations eating when feeling

bored and eating when feeling tired. The significant differences are described below.

For the situation eating when feeling bored, for the BN group the emotion disgusted was rated significantly higher than the emotion distressed. For the BED group, embarrassed was rated significantly lower than anxious, distressed, disgusted, guilty and sad. Further, the emotions distressed and sad were rated significantly lower than guilt. For the OW and NW groups, guilty was rated significantly higher than embarrassed, anxious, distressed and sad. The situation eating when feeling upset, the BN and BED groups rated embarrassed significantly lower than anxious, distressed, disgusted, guilty and sad. The NW group rated sad significantly higher than embarrassed, anxious and disgusted. The OW group rated distressed significantly higher than embarrassed and disgusted. The situation, eating when feeling tired, there were only significant differences for the BED group. The emotions guilty and disgusted were rated significantly higher than embarrassed, and additionally, guilty was rated higher than sad. The situation, eating when feeling happy, there were only significant differences for the BN group. The emotion guilt was rated significantly higher than embarrassed, distressed and sad.

The emotions were compared across the different eating situations for the different groups. Post hoc analyses showing significant differences can be seen in Table 18.

Table 18.

Post hoc analyses comparing emotional responses between groups across four eating situations.

Emotion	Significant Differences	
Embarrassed	BN Feeling bored >	BN, BED, OW, NW Feeling tired BN, BED, OW, NW Feeling happy OW, NW Feeling upset
	BN Feeling upset >	BED, OW, NW Feeling tired BN, BED, OW, NW Feeling happy
	BED Feeling upset >	BED Feeling tired BED Feeling happy
Anxious	BN Feeling bored>	BN, BED, OW, NW Feeling tired BN, BED, OW, NW Feeling happy OW, NW Feeling upset
	BN Feeling upset >	BN, BED, OW, NW Feeling tired BN, BED, OW, NW Feeling happy OW, NW Feeling bored
	BN Feeling tired >	OW, NW Feeling happy
	BED Feeling bored >	BED, OW, NW Feeling tired BED, OW, NW Feeling happy NW Feeling upset
	BED Feeling upset >	BED, OW, NW Feeling tired BED, OW, NW Feeling happy OW, NW Feeling bored
	OW Feeling upset >	OW Feeling tired OW Feeling happy
Distressed	BN Feeling bored>	BN, BED, OW, NW Feeling tired BN, BED, OW, NW Feeling happy NW Feeling upset
	BN Feeling upset >	BN, BED, OW, NW Feeling tired BN, BED, OW, NW Feeling happy OW, NW Feeling bored

(table continues)

Table 18. *(continued)*

	BN Feeling tired >	OW, NW Feeling happy BED Feeling upset
	BED Feeling bored >	BED, OW, NW Feeling tired BED, OW, NW Feeling happy
	BED Feeling upset >	BED, OW, NW Feeling tired BN, BED, OW, NW Feeling happy BED, OW, NW Feeling bored
	OW Feeling upset >	OW Feeling tired OW Feeling happy OW Feeling bored
Disgusted	BN Feeling bored>	BN, BED, OW, NW Feeling tired BN, BED, OW, NW Feeling happy OW, NW Feeling upset
	BN Feeling upset >	BN, BED, OW, NW Feeling tired BN, BED, OW, NW Feeling happy OW, NW Feeling bored
	BN Feeling tired >	NW Feeling happy
	BED Feeling bored >	BED, OW, NW Feeling tired BED, OW, NW Feeling happy OW, NW Feeling upset
	BED Feeling upset >	BED, OW, NW Feeling tired BN, BED, OW, NW Feeling happy OW, NW Feeling bored
	BED Feeling tired >	BED Feeling happy
Guilty	BN Feeling bored>	BN, OW, NW Feeling tired BN, BED, OW, NW Feeling happy OW, NW Feeling upset
	BN Feeling upset >	BN, OW, NW Feeling tired BN, BED, OW, NW Feeling happy OW, NW Feeling bored
	BN Feeling tired >	OW, NW Feeling happy
	BN Feeling happy >	OW, NW Feeling tired

(table continues)

Table 18. *(continued)*

	BED Feeling bored >	OW, NW Feeling tired BED, OW, NW Feeling happy OW, NW Feeling upset
	BED Feeling upset >	BED, OW, NW Feeling tired BED, OW, NW Feeling happy OW, NW Feeling bored
	BED Feeling tired >	BED, OW, NW Feeling happy
	NW Feeling bored >	NW Feeling tired NW Feeling happy
	OW Feeling bored >	OW Feeling tired OW, NW Feeling happy
Sad	BN Feeling bored>	BN, BED, OW, NW Feeling tired BN, BED, OW, NW Feeling happy OW, NW Feeling upset
	BN Feeling upset >	BN, BED, OW, NW Feeling tired BN, BED, OW, NW Feeling happy BED, OW, NW Feeling bored
	BED Feeling bored >	OW, NW Feeling tired BED, OW, NW Feeling happy BED Feeling upset
	BED Feeling upset >	BED, OW, NW Feeling tired BED, OW, NW Feeling happy OW, NW Feeling bored
	NW Feeling upset >	NW Feeling bored NW Feeling tired NW Feeling happy
	OW Feeling upset >	OW Feeling tired OW Feeling happy

From Table 18, it can be seen that for the emotion embarrassed, the BN group rated the situation eating when feeling bored higher than the BN, BED, OW and NW groups for the situation eating when feeling tired and eating when feeling happy, and higher than the OW and NW groups for the situation eating

when feeling upset. Further, for the situation eating when feeling upset, the BN group rated the response embarrassed higher than the BN, BED, OW, and NW groups for the situation eating when feeling happy, and higher than the BED, OW and NW for the situation eating when feeling tired. Additionally, the BED group rated significantly higher levels of embarrassment for the situation eating when feeling upset than the eating when feeling tired and eating when feeling happy.

The BN group reported feeling more anxious eating when feeling bored and eating when feeling upset than the BN, BED, OW, and NW groups for the eating situations eating when feeling tired and eating when feeling happy. The BN group also rated higher levels of anxiety for the situation eating when feeling bored compared to the OW and NW groups for eating when feeling upset. In addition, the BN group rated higher levels of anxiety for the situation eating when feeling upset than the OW and NW groups for the situation eating when feeling bored. Eating when feeling tired was rated with higher levels of anxiety by the BN group than eating when feeling happy for the OW and NW groups. The BED group rated significantly higher levels of anxiety for the situation eating when feeling bored and eating when feeling upset than the BED, OW and NW groups for the eating situations eating when feeling tired and eating when feeling happy. The BED group also rated eating when feeling bored as more anxious than the NW group for the situation eating when feeling happy. The situation eating when feeling upset was rated with higher levels of anxiety by the BED group than the OW and NW groups eating when feeling bored. Finally, the OW group rated the situation eating when feeling upset higher in anxiety than eating when feeling tired and eating when feeling happy.

The BN group reported feeling more distress eating when feeling bored and eating when feeling upset than the BN, BED, OW, and NW groups for the eating situations eating when feeling tired and eating when feeling happy. The BN group also rated higher levels of distress for the situation eating when feeling bored compared to the NW group for eating when feeling upset. In addition, the BN group rated higher levels of distress for the situation eating when feeling upset than the OW and NW groups for the situation eating when feeling bored. Eating when feeling tired was rated with higher levels of distress by the BN group than eating when feeling happy for the OW and NW groups, and eating when feeling upset for the BED group. The BED group rated significantly higher levels of distress for the situation eating when feeling bored and eating when feeling upset than the BED, OW and NW groups for the eating situations eating when feeling tired and eating when feeling happy. The BED group also rated eating when feeling upset as more distressing than the BED, OW and NW groups for the situation eating when feeling bored. The OW group rated the situation eating when feeling upset higher in distress than eating when feeling tired, happy, and bored.

The emotional response disgust was rated significantly higher by the BN group for the situations eating when feeling bored and upset than the BN, BED, OW and NW groups for the situations eating when feeling tired and happy. In addition, the BN group rated eating when feeling bored with higher levels of disgust than the OW and NW groups rated eating when feeling upset. The situation eating when feeling upset was rated with higher levels of disgust by the BN group than eating when feeling bored for the OW and NW groups. The BN group rated eating when feeling tired higher than the NW group eating when

feeling happy on the emotional response disgust. For the BED group, eating when feeling bored and upset were rated with higher levels of disgust than eating when tired and happy for the BED, OW, and NW groups. In addition, the BED groups rated eating when feeling bored higher on disgust than eating when feeling upset for the OW and NW groups. Eating when feeling upset for the BED group was rated higher on disgust than eating when feeling bored for the OW and NW groups and eating when feeling happy for the BN group. Finally, the BED group rated eating when feeling tired as higher in disgust than eating when feeling happy.

For the emotional response guilty, the BN group rated eating when feeling bored and upset as higher than the BED, OW and NW groups for eating when feeling tired, and the BN, BED, OW and NW groups for the situation eating when feeling happy. Further, for the BN group, guilt for the situation eating when feeling bored was rated higher than the OW and NW groups eating when feeling upset. Eating when feeling upset was rated higher for the BN group on the response guilt than the OW and NW groups eating when feeling bored. Eating when feeling tired was rated higher in guilty for the BN group than eating when feeling tired for the OW and NW groups. Finally, for the BN group, eating when feeling happy was rated higher in guilt than eating when feeling tired for the OW and NW groups. For the BED group, eating when feeling bored and upset was rated higher on the response guilt than the BED, OW and NW groups for the situation eating when feeling happy. Eating when feeling bored was rated as higher in guilt for the BED group than the OW and NW groups for the situations eating hen feeling tired and upset. The BED group rated eating when feeling upset as higher in guilt than the BED, OW and NW groups

for the situation eating when feeling tired, and the OW and NW groups for the situation eating when feeling bored. The BED group also rated eating when feeling tired as higher in guilt than the BED, OW and NW groups for the situation eating when feeling happy. The NW group rate eating when feeling bored as higher in guilt than eating when feeling tired and happy. Finally, the OW group rated eating when feeling bored as higher in guilt than the OW group eating when feeling tired and the OW and NW groups for eating when feeling happy.

The emotional response sad was rated significantly higher by the BN group for the situations eating when feeling bored and upset than the BN, BED, OW and NW groups for the situations eating when feeling tired and happy. In addition, the situation eating when feeling bored for the BN group was rated higher than the situation eating when feeling upset for the OW and NW groups. The BN group rated eating when feeling upset as higher in sadness than the BED, OW and NW groups for eating when feeling bored. The BED group rated eating when feeling bored as sadder than the OW and NW groups rated eating when feeling sad, the BED, OW and NW groups rated eating when feeling happy and the BED group rated eating when feeling upset. Further, the BED group rated eating when feeling upset as sadder than the BED, OW and NW groups rated eating when feeling tired and happy, and the OW and NW groups rated eating when feeling bored. The NW group rated eating when feeling upset as sadder than eating when feeling bored, tired and happy. The OW group rated eating when upset as sadder than eating when feeling tired and happy.

10.3.2 Subjective response to imagery

The means and standard deviations for the VASs for each group for each stage of each script are presented in Appendix M. There were no significant script by stage by group interactions.

Script x Stage Interactions

There were significant script by stage interactions for the VASs happy/sad, $F(4.54,254.34) = 5.84$, $MSE = 1826.02$, $p = 0.000$; and untroubled/guilty, $F(5.14,288.05) = 5.59$, $MSE = 1996.62$, $p = 0.000$. Significant post hoc analysis results comparing the scripts at each stage for these VASs are presented in Table 19.

Table 19.

The results of the post hoc analyses for the significant comparisons between scripts at each stage for each of the emotional response VASs.

VAS	STAGE				
	Scene	Approach	Incident	Resolution	Conseq
Happy/Sad	B>E, N	B>E, N	B>E, N	B>E, N	B>E, N
Untroubled/Guilty	B>E, N	B>E, N	B>E, N E>N	B>E, N	B>E, N

Further, the post hoc analysis results for the comparison across consecutive stages of the binge eating script are presented in Table 20. There were no significant differences across consecutive stages of the normal eating and neutral scripts.

Table 20.

The results of the post hoc analyses comparing differences across consecutive stages of each script for each of the emotional response VASs.

VAS	Binge Eating Script
Happy/ Sad	Incident<Resolution
Untroubled/ Guilty	Scene<Approach<Incident<Resolution

In general, these results show that the binge eating related script was rated significantly higher than the normal eating and neutral scripts at each stage of the two scripts. This means that participants endorsed distorted cognitions more strongly when thinking about engaging in binge eating. Significant consecutive changes across the scripts were only found for the binge eating related scripts, with a consistent increase from the incident to the resolution stage being demonstrated.

When considering the VAS individually, the interaction for the VAS happy/sad is shown in Figure 19.

Figure 19. The mean ratings for the VAS happy/sad for the three scripts across each of the five stages.

The binge eating related script was rated significantly higher than the normal eating and neutral scripts at each of the five stages. Further, there were significant changes across the stages of the binge script, with a significant increase from the incident to the resolution stage.

The interaction for the VAS untroubled/guilty, is shown in Figure 20.

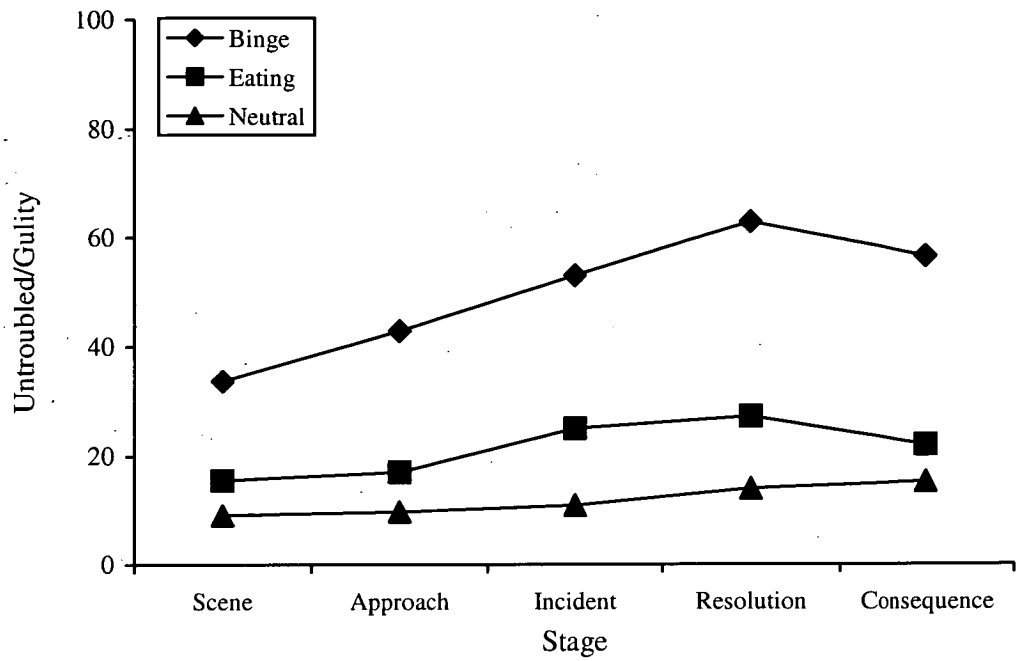

Figure 20. The mean rating for the VAS untroubled/guilty for the three scripts across each of the five stages.

The binge eating related script was significantly higher than the normal eating and neutral scripts for each of the five stages. There were no significant differences between the normal eating and neutral scripts, with the exception of the incident stage, where the normal eating script was rated significantly higher than the neutral script. Further, there were significant changes across the stages of the binge script, with ratings increased significantly from the setting the scene stage to the approach, the approach to the incident, and between the incident and resolution stages.

Script x Group Interactions

There were significant script by group interactions for the VASs unafraid/afraid, $F(4.78,89.13) = 11.25$, $MSE = 13761.72$, $p = 0.000$; happy/sad,

$F(5.59,104.40) = 20.26$, $MSE = 16166.04$, $p = 0.000$; and untroubled/guilty, $F(5.21,97.32) = 18.00$, $MSE = 15386.53$, $p = 0.000$.

The post hoc analysis results comparing each script for each of the VASs are presented here. Table 21 contains the results for the comparisons between groups for each script. Table 22 shows the comparisons between scripts for each of the four groups.

Table 21.

The post hoc results for the comparison between groups for each script for each of the VASs.

VAS	SCRIPT		
	Binge	Eating	Neutral
Unafraid/Afraid	BN, BED>OW, NW	BN, BED> OW, NW	ns
Happy/Sad	BN, BED> OW, NW	ns	ns
Untroubled/Guilty	BN, BED> OW, NW	BN>BED, OW, NW	ns

Table 22.

The results of the post hoc analyses comparing the ratings for the emotional VASs between each script for each group.

VAS	GROUP			
	BN	BED	OW	NW
Unafraid/Afraid	B>E, N E>N	B>E, N	ns	ns
Happy/Sad	B>E, N	B>E, N	ns	ns
Untroubled/Guilty	B>E, N E>N	B>E, N	B>E, N	ns

Overall results show that, in general, there were differences between groups on the binge eating and normal eating scripts, with the BN and BED groups rating significantly higher than the NW and OW groups. This indicates that, in most cases, the BN and BED groups reported experiencing significantly greater negative emotions. Further, on the whole the binge eating related script had significantly higher negative emotions endorsed than the normal eating and neutral scripts by the BN and BED groups.

When examining the VASs individually, the interaction for the VAS unafraid/afraid is presented in Figure 21.

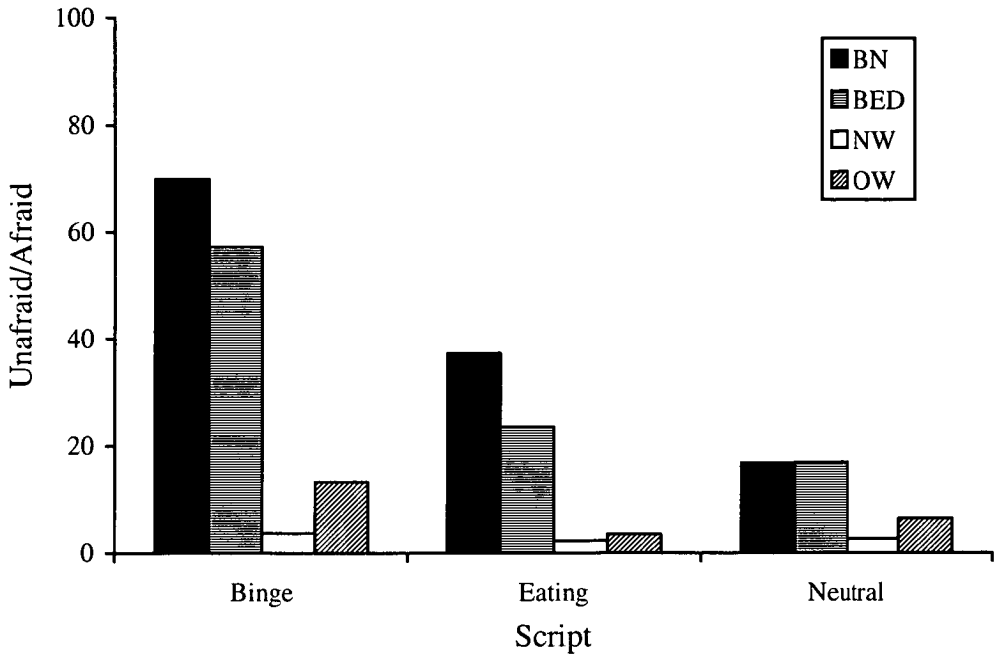

Figure 21. The mean ratings for the VAS unafraid/afraid for each script for each of the four groups.

From Figure 21 it can be seen that the BN and BED groups demonstrated a significantly higher overall response then NW and OW groups for the binge eating and normal eating scripts. Additionally, the binge eating script was rated significantly higher than the normal eating and neutral scripts by the BN and BED groups, and the eating script was rated higher than the neutral script by the BN group.

For the VAS happy/sad, the interaction can be seen in Figure 22.

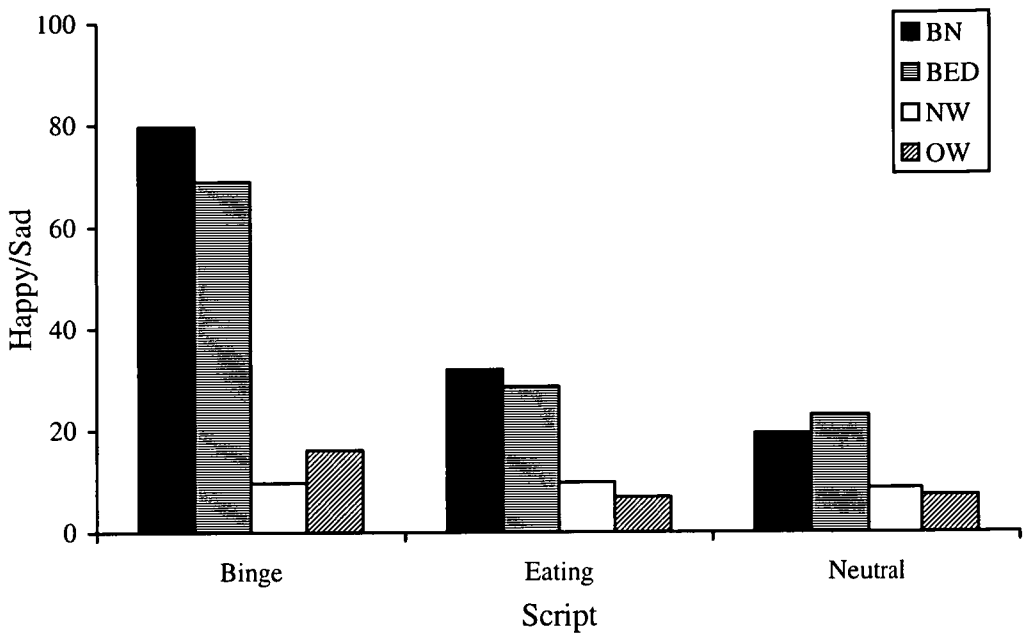

Figure 22. The mean ratings for the VAS happy/sad for each script for each of the four groups.

The BN and BED groups demonstrated a significantly higher overall response than the NW and OW groups for the binge eating script. In addition, the BN and BED groups rated the binge eating script significantly higher than the normal eating and neutral scripts.

For the VAS untroubled/guilty, the interaction is presented in Figure 23.

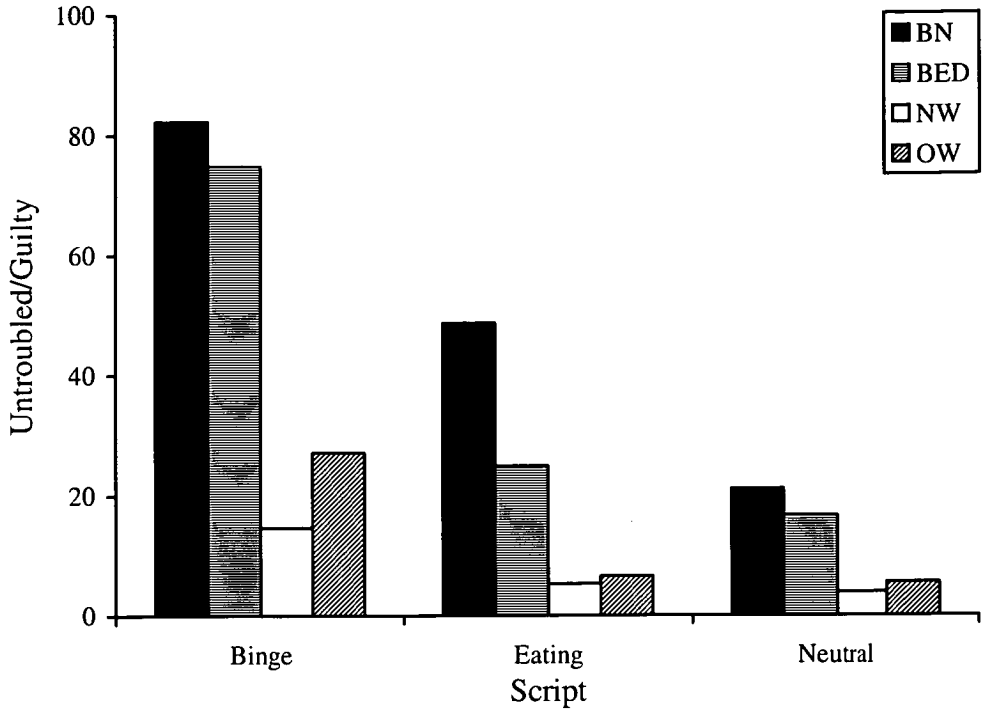

Figure 23. The mean ratings for the VAS untroubled/guilty for each script for each of the four groups.

The BN and BED groups demonstrated a significantly higher overall response than the NW and OW groups for the binge eating script. Additionally, for the normal eating script, the BN group rated significantly higher than the BED, NW and OW groups. When examining script differences, the binge eating script was rated significantly higher than the normal eating and neutral scripts by the BN, BED and OW groups. Further, the BN group rated the eating script higher than the neutral script.

10.4 DISCUSSION

The aim of this study was to investigate the emotional responses of individuals with BN, BED, OW and NW to general eating situations and in

relation to binge eating by examining the changes in responding over the course of binge eating.

The examinations of emotional responses were approached in two ways, firstly, a general response to eating related stimuli was considered, and secondly, the changes in emotional responding and examination of the process of binge eating were investigated. Although information about group differences can be determined from the first approach, little knowledge can be gained about cause and effect without consideration of changes over the course of a binge eating episode. For example, it would need to be determined whether emotional distress initiated binge eating behaviour in a particular situation, or whether emotional distress occurred as a consequence of eating in that situation. The second approach allows for clarification of such issues.

With regard to the first approach, group differences in response to particular eating situations were considered. The BN and BED groups had elevated negative emotional responses compared to the OW and NW groups. Previous studies have reported similar findings, with individuals with BN responded more negatively than non-eating disorder controls (Johnson & Larson, 1982), and obese individuals with BED responded with considerably more negative emotional responses than a non-BED obese group (Greeno et al., 2000). Furthermore, Lingswiler et al. (1989) reported that individuals with BN and BED experience significantly greater negative moods than non-eating disorder controls experience prior to all eating episodes.

In response to eating alone at home, both the BN and BED groups could not be distinguished on the basis of their reactions. They experienced a range of negative responses including anxiety, distress, disgust, guilt, sadness and loss of

control. However, the overall rating of these responses indicated low levels of negative emotional response with the exception of control, where lack of control was rated as moderate. In contrast, the BED and the OW groups could be differentiated on the basis of their response to eating when alone at home, with the OW group experiencing lower negative emotional response.

Despite the fact that the privacy of one's home would increase the risk that binge eating would occur (deZwaan et al., 1992; Engstroem & Norring, 2001; Schlundt et al., 1985), it would appear that both the BN and BED groups were relatively comfortable about eating in this situation, albeit less comfortable than the OW and NW groups. Certainly, all groups reported little embarrassment about eating in this situation supporting the notion that levels of distress would be low. To a moderate degree, hunger was driving the decision to eat for all groups in this situation. It is important to note that the questionnaire was related to eating, not binge eating.

When examining the situation of eating in front of family and friends, the BN and BED groups clearly reported being more embarrassed than the OW and NW groups. In this situation, the BN and BED groups could be distinguished on the basis of anxiety, distress, disgust, guilt and sadness, with the BN group reporting the most negative responses. In addition, the BED group scored higher than the OW and NW groups on these same variables.

Hunger was driving eating in this situation, but for the BN group other factors would have been causing the elevated levels of emotional response. The literature would suggest that individuals with BN would avoid eating in situations where their behaviour was under scrutiny (deZwaan et al., 1992; Engstroem & Norring, 2001). However, previous studies have reported that food

consumption increases in the presence of others (e.g., Clendenen et al., 1994; de Castro, 1994; Patel & Schlundt, 2001). The presence of others can include friends, family and strangers. This may explain the elevated response for hunger, with other emotional states also being elevated in the BN and BED groups.

The BED group had elevated negative emotional responses in comparison to the OW and NW groups, but less than the BN group. In most cases, the pattern of negative response was the same for both the BN and BED groups, however, the intensity was greater for the BN group. With embarrassment not distinguishing the groups, it may be that the BN group is reacting more strongly to the embarrassment, resulting in the increased negative emotional responses in comparison to the BED group.

When considering eating in public, ratings of negative response were elevated on those variables that had social implications, namely embarrassment, anxiety, guilt and loss of control. In fact, the BN and BED groups were not differentiated on any of the variables, although the BED and OW groups were distinguished on the basis of these same socially related variables. An early study on food choice in public found that obesity did not affect the amount or type of food chosen (Coll, Meyer, & Stunkard, 1979).

When the diagnostic criteria for BN and BED are examined (APA, 1994), embarrassment, disgust and guilt are related specifically to BED and not BN. However, when examining responses to these emotions in this situation, the BN group rated their reactions more negatively than the BED group. The BED group responded significantly more negatively than the OW and NW groups. A possible explanation for this is that BN is a more serious form of eating disorder and, therefore, is associated with more severe psychological disturbance in

response to eating situations (Fichter et al., 1993; Fitzgibbon et al., 2003). In addition, the results from Chapter 8 indicated that the BN group had more elevated levels of eating symptomatology and general symptomatology than the BED group, indicating that BN is a more serious form of eating disorder. Furthermore, the factors that are specifically related to BED in the DSM-IV (APA, 1994) were endorsed strongly by both the BN and BED groups.

Higuchi and Fukada (2002) examined factors associated with embarrassment in public and private situations, and found that it is associated with four different causal factors. These factors were the same for both situations, however, they were ranked in a different order. The factors associated with embarrassment were disrupting a social interaction, apprehension of social evaluation, inconsistency with self-image, and a loss of self-esteem.

The results of the SRI indicate that the BN and BED groups for the situations eating in front of family and friends and eating in public have elevated responses for embarrassment. It may be that eating in these situations are more strongly related to the factors Higuchi and Fukada (2002) found to be associated with embarrassment for the BN and BED groups than the OW and NW groups. Factors such as an apprehension of social evaluation and loss of self-esteem would be associated with cognitive responses to eating. In Chapter 11, the cognitions associated with binge eating and normal eating will be examined. If these are found to be more elevated for the BN and BED groups than the NW and OW groups, then this would provide some evidence to support this proposition.

The higher ratings of embarrassment may be due to distorted cognitions. However, it has been reported in the literature that individuals tend to exaggerate

fears when feeling embarrassed (Savitsky, Epley, & Gilovich, 2001). Therefore, higher levels of embarrassment may result in more distorted cognitions relating to food and body.

Eating studies have used confederates to examine whether eating behaviour is affected by the behaviour of others. In general, women have been found to eat less when the confederate was male (Mori et al., 1987; Pliner & Chaiken, 1990). The explanation for this decrease was that women wanted to appear more socially desirable and appear more feminine. Males were also found to decrease their consumption of food when the confederate was of the opposite sex. Again, this appears to be due to males wanting to present as more socially desirable (Pliner & Chaiken, 1990). These studies indicate that individuals change their eating behaviour when eating with others. The results from this study show that emotionally, individuals respond differently to distinct situations.

The BN and BED groups not only had more elevated responses than the OW and NW groups, they also had greater variation in their responses. A study by Schenker (1998) compared individuals with BN, dieters and non-eating disordered controls to examine social interaction. A female confederate disagreed with 80 percent of responses on moral dilemmas. It was found that the BN group changed their mind to agree with the confederate more than the dieting and non-eating disordered control groups (Schenker, 1998). This indicated that individuals with BN have a greater need for social approval. This result is consistent with the more elevated emotional responses for the BN and BED groups. If individuals with BN have a greater need for social approval, it would

be expected that they would have more elevated emotional responding to eating in social situations that OW and NW groups.

The ratings for hunger levels indicated that all groups engage in eating in public in response to hunger. Therefore, BN and BED groups' hunger meant that they engaged in eating, despite the moderate levels of associated negative emotional response. If negative emotional reactions had been extreme rather than moderate for the BN and BED groups, then it may have been that these individuals would not have engaged in eating behaviour in this situation. An alternative explanation may be that hunger is an acceptable precursor to eating, and provides justification. Further, eating in public may be due to the need for social approval in the eating disorder groups (e.g., Schenker, 1998).

The emotional responses elicited from the situation eating when feeling bored were more negative than in response to eating in public. Anxiety, distress, disgust and sadness did not distinguish the BN and BED groups. These groups were distinguished on the basis of embarrassment and hunger. Eating was only recognised as being associated with hunger for the BN group and embarrassment was only evident to any degree for the BN group.

It is generally accepted that when boredom leads to eating, it usually is not associated with hunger cues. The relatively higher rating of hunger for the BN group indicates that they may be less able to accurately interpret hunger and satiety signals. There is evidence in the literature to suggest that this occurs (e.g., Anderson, Stoner, & Rolls, 1996; Hetherington & Rolls, 2001; Sunday & Halmi, 1996).

Females have been found to be more likely to eat in response to boredom than males (Abramson & Stinson, 1977; Wilson, 1986). Individuals who

experience food cravings were found to have higher ratings of boredom during the day (Hill et al., 1991). Further, individuals who engage in binge eating rated boredom prior to the binge as one of the most intense antecedents (Stickney et al., 1999). The expectancy for negative reinforcement from eating, to alleviate boredom, was found to be associated with BN symptoms (Hohlstein et al., 1998; Lacey et al., 1986; Simmons, 1998; Simmons et al., 2001).

Different patterns of response were evident for the BED and OW groups. The similarity of the OW and NW groups suggests that individuals who are OW respond in a manner that is within the spectrum of normal eating behaviour.

The BN and BED groups responded in a similar and strongly negative way to eating when feeling upset. Negative mood is a common precipitant for binge eating for both of these groups (e.g., Costanzo et al., 1999; Lingswiler et al., 1989; Mitchell et al., 1999; Powell & Thelen, 1996). The only differences between these two groups were for the ratings of embarrassment and hunger. Again, embarrassment and hunger were more strongly endorsed by the BN group.

In contrast to eating when feeling upset, eating when feeling tired elicited lower levels of psychological responses. Although BN and BED were not differentiated on the basis of anxiety, disgust, or guilt, the BN group did experience more embarrassment and distress than the BED group from eating when feeling tired. There is evidence in the literature that the level of distress increases when individuals have inadequate coping strategies (Freedy & Hobfoll, 1994; Molassiotis, Van Den Akker, Milligan, & Goldman, 1997; Niemi & Vainiomaeki, 1999; Stoddard, 1995). Eating when feeling tired for the BN group

as a means of coping with the tiredness may result in higher levels of reported distress.

There was substantial evidence that the BED and OW groups' emotional response to eating was different. In response to most psychological variables, the OW group demonstrated little evidence of disturbance in this eating situation, and did not differ to the NW group.

In response to eating when feeling happy, the BN group was distinguished from all other groups on the emotional responses embarrassed, anxious, disgust and guilt. The BN and BED groups were only similar on the basis of lack of control, but this variable was not particularly problematic in this eating situation. Eating when happy was more likely to be associated with feelings of hunger for all groups.

Even in situations when individuals with BN are eating when feeling happy, they still experience relatively higher levels of negative emotional response. This indicates that individuals with BN respond with negative emotional states to eating in any situation. The literature shows that individuals with BN have higher levels of eating concern than non-eating disordered individuals (e.g., Cooper et al., 1989). The elevated levels of eating concern for individuals with BN is supported by this finding.

Examination of the responses to the different environments indicated that there were only variations for the BN and BED groups. For the BN group, eating alone elicited responses predominantly related to anxiety and self-loathing. When eating with friends the main feeling is one of guilt, and when eating in public the responses were characterised by embarrassment and anxiety. This indicates a change in response to eating in different environments, ranging from

introspective negative evaluations when eating alone, to intensely uncomfortable feelings resulting from being scrutinised by others. The characteristic emotional response differs depending on whether observers are familiar or unfamiliar, with feelings of guilt being associated with eating with family and friends indicating that they feel that they should not be eating, whereas eating in public results in an escalation of negative emotional response to the point of embarrassment and anxiety (Higuchi & Fukada, 2002).

When considering the responses of the BED group, the same patterns of anxiety and self-loathing when eating alone, and embarrassment and anxiety when eating in public found with the BN group were noted. For the situation of eating in front of family and friends, the BED group responded with elevated negative emotional responses, but no particular emotion was more strongly endorsed. This indicated that they felt uncomfortable in this situation, but in a more general sense.

When examining the results to determine whether BN and BED are distinct diagnostic entities, it was evident that there was some overlap in the nature of responses for the BN and BED groups. What differentiated the BN from the BED group was the feeling of guilt associated with eating in front of family and friends.

Differences in the emotional responses across eating situations were examined. For the BN group, eating when being observed by others was more problematic than eating alone. The one exception was for the emotional response of guilt, where eating in front of family and friends was more problematic than eating in public. Guilt, associated with eating, has been found to be clearly related to individuals with problematic eating (Burney & Irwin,

2000). High levels of guilt have been reported to be more common for individuals with BN than non-BN groups (Allen, Scannell, & Turner, 1998; Frank, 1991). In addition, women who engage in binge eating reported significantly greater fluctuations in guilt than women who do not binge eat (Sanftner & Crowther, 1998).

Women with more severe binge eating were found to have a significantly higher level of public self-consciousness than individuals with less severe binge eating (Wood, 1995). The higher levels of public self-consciousness were associated with more intense feelings of guilt. In support of this finding, Grebel (1995) compared individuals with eating disorders, a history of an eating disorder, mild eating disorder symptoms and non-eating disordered women. It was found that as the severity of eating disorder increased so did the level of guilt. Individuals with ineffective strategies for alleviating guilt feelings experienced greater levels of eating disturbance (Bybee, Zigler, Berliner, & Merisca, 1996).

For the BED group, it was only embarrassment that differentiated the emotional reactions to eating in different situations. Both situations associated with being observed were more problematic than eating alone. This is consistent with the findings of Higuchi and Fukada (2002). Embarrassment was associated with an apprehension of social evaluation and a loss of self-esteem as well as being inconsistent with self-image and disrupting a social interaction. Eating in front of others for individuals with BED may be associated with some of these factors.

Comparison of emotionally laden situations for each group indicated differences between the various situations. For the BN group eating when bored

elicited feelings of disgust, and eating when upset elicited feelings of anxiety and emotional responses consistent with self-loathing. In a non-clinical group, women with abnormal eating attitudes were found to have higher levels of disgust in relation to food and body (Harvey, Troop, Treasure, & Murphy, 2002). In support of this, individuals with eating disorders have been found to not have increased global disgust sensitivity, but report higher levels of disgust sensitivity in relation to food and the body (Davey, Buckland, Tantow, & Dallos, 1998; Troop, Murphy, Bramon, & Treasure, 2000; Troop, Treasure, & Serpell, 2002).

It is interesting to note that feelings of guilt were more strongly felt than other emotional responses by the BN group while eating when happy. The most likely explanation for this is that eating in the BN group causes pervasive negative responses independent of the emotional content of the situations. However, on the basis of the response of the SRI alone, it could not be discounted that the BN group respond poorly to most situations irrespective of whether eating is involved. Examination of the emotional and cognitive responses to non-eating situations would provide further clarification.

Anxiety and self-loathing responses were reported by the BED group in relation to eating when bored and upset, and feelings of guilt were apparent while eating when tired. When taken as a whole, the differences between BN and BED were greater than the similarities.

Eating when bored and upset elicited distinctive patterns for the OW and NW group. For eating when bored both groups reported more guilt than other emotional responses. Eating when bored is not generally in response to hunger, and is interpreted, even by non-eating disordered individuals, as an undesirable behaviour. The distress of the OW group and the sadness of the NW group in

relation to eating when upset probably reflects the emotional situation, rather than a response to eating. There is very little evidence to suggest that the BED and OW groups are similar in their response to these emotionally laden situations.

Comparisons of each separate emotional response to the different emotionally laden situations for each group were made. For the BN group, emotional responses to eating situations when feeling bored or upset resulted in greater negative emotional responses than eating when feeling tired or happy. This may be due to the boredom and negative affect being associated with antecedents to binge eating in both of the eating disorder groups (Hill et al., 1991; Hohlstein et al., 1998; Stickney et al., 1999). For the BED group the general pattern of emotional responses was similar to the BN group.

For the OW and NW groups, some eating situations elicited a stronger emotional response than others, in particular, eating when upset. However, it should be noted that the overall level of negative emotional response was low in comparison to the BN and BED groups. There is sufficient evidence to suggest that the BED and OW groups differ in their emotional responses to different eating situations.

When considering subjective response to imagery, the pattern of responses between scripts at each stage was the same for all groups. Binge eating or overeating elicited the most negative response followed by the normal eating script and then the neutral script at all stages. It would seem that the emotional response to binge eating or overeating is problematic for many people whether or not they are eating disordered. That is, at the time of overeating negative emotional responses are felt for all groups. If there are no differences in

emotional responses to binge eating or overeating, it may be that the interpretation of the event and cognitions relating to food and eating are more able to distinguish between the groups. This will be discussed in the following chapter.

In response to normal eating at the incident stage, the BN group reported more guilt than was reported in relation to the neutral imagery. This was not evident for other groups. The difficult relationship that individuals with BN have with food and eating would account for this result.

There were across stage differences. For the binge eating script, there is an indication of increased negative response across the stages that does begin to resolve at the consequence stage. It appears that the resolution seems to be handled differently by the groups and may relate to factors not associated with the process of bingeing or the response at the time of bingeing. For example, it is well established that the continued negative response is dealt with by purging in the BN group. Alpers and Tuschen-Caffier (2001) examined a broad range of negative feelings. They found that for individuals with BN, their general mood state worsened after binge eating and returned to pre-binge levels after engaging in purging.

In may also be the case that factors associated with binge eating do play a role in the way in which the different groups cope with the negative emotional response. For example, cognitions at the time of the event may make it problematic for the BN group to continue to experience negative emotional response requiring them ultimately to purge, whereas the cognitions of the BED group may make it easier to cope with the negative emotional reaction. This will be examined further in the next chapter.

However, it should be noted that despite there being no difference in the pattern of response to scripts at each stage, there were group differences in the intensity of the response to the different scripts suggesting that the overall negative reaction was greater for some groups than others. In particular, the BN and BED groups had more intense negative responses than the NW and OW groups.

The BN and BED groups reported elevated negative emotional responses compared to the OW and NW groups in reaction to binge eating and more fear also in response to normal eating. The binge eating script elicited more fear and sadness than the normal eating and neutral scripts for the BN and BED groups only. It is well documented in the literature that negative affect is involved in the onset of binge eating for both BN and BED (e.g., Arnow et al., 1992; Costanzo et al., 1999; Hsu, 1990; Lingswiler at al., 1989; Mitchell et al., 1999; Powell & Thelen, 1996).

There have been conflicting findings regarding mood during the binge. The results from this study indicate that negative mood increasing during binge eating. There was no evidence that eating behaviour during the binge results in relief from negative emotions. Other studies have also reported that the eating behaviour during the binge does not result in a decrease in negative emotions for individuals with both BN and BED (e.g., Arnow et al., 1992; Johnson & Larson, 1982; Mitchell et al., 1999).

Immediately after binge eating, from the incident to the resolution stage, there was a significant increase in negative emotion. This finding is consistent with the literature, that has found individuals with BN and BED to have high levels of negative mood after binge eating (e.g., Elmore & de Castro, 1990; Hsu,

1990; Kenardy et al., 1996; Lingswiler et al., 1989; Mitchell et al., 1999; Powell & Thelen, 1996).

The BN, BED and OW groups rated the normal eating script as eliciting more guilt than the neutral script. There was some evidence that the BN group was different in their response than other groups. The BN group rated more fear and guilt to normal eating than to neutral imagery. Indeed, the BN group rated their guilt to normal eating higher than all other groups.

In summary, the general responses to eating demonstrated that the BN and BED groups had elevated negative emotional responses in comparison to the OW and NW groups. The situation in which the eating occurred had a greater effect on negative emotional responding for the BN and BED groups. Further, the emotional state in which the eating occurred caused more negative responding for the BN and BED groups. As predicted in the hypotheses, eating in social situations and eating when feeling bored or upset resulted in more elevated negative emotional responses than eating in private and eating when feeling tired and happy.

The guided imagery to binge eating, normal eating and neutral eating demonstrated differences between groups. The BN and BED groups endorsed negative emotions more strongly than the OW and NW groups. For normal eating, the BN and BED groups also showed more negative responding than the OW and NW groups, and the BN group was more negative then the BED group. For the BED group, the binge eating script was endorsed as being more negative than the normal eating and neutral scripts. However, for the BN group the binge eating script was endorsed as more negative than the normal eating script, and the normal eating script was endorsed as more negative than the neutral script.

This indicates that eating in general is more dysfunctional for the BN group, whereas for individuals with BED, binge eating caused elevated negative emotional responses than normal eating.

Overall, the results from this study indicate that the BED group is more similar to the BN group than to the OW group in terms of emotional response. The OW group was more similar to the NW group. This provides further evidence to suggest that BED is an eating disorder, rather than an eating disturbance.

CHAPTER 11

STUDY 4: COGNITIONS AND COGNITIVE RESPONSES TO BINGE EATING

11.1 INTRODUCTION

Studies 2 and 3 have examined psychophysiological and emotional responses of individuals with BN, BED, and those who are OW and NW. The results so far indicate that the responses of individuals with BED are more similar to those of individuals with BN than OW individuals. Further, the results have suggested that the BN group is more dysfunctional than the BED group.

Given that the subjective psychophysiological and emotional responses have been found to change across a binge eating episode for individuals with BN and BED, it would be important to also examine cognitions and whether the degree of endorsement changes. In addition to this, the general level of cognitive distortion would need to be examined. In Chapter 7 a review of the literature regarding cognitive distortion of individuals with BN and BED, both in general and those specific to food and eating, was conducted. An overview has been summarised below.

Cognitions have been found to be an important factor in the development and maintenance of BN (e.g., Cooper & Fairburn, 1992; Dritschel et al., 1991). When examining general cognitive distortions in BN, contradictory findings have been presented. However, when BN groups are based on DSM-IV diagnostic criteria (APA, 1994), individuals with BN tend to have higher levels of cognitive distortion than non-eating disordered control groups (e.g., Leung et al., 1999; Powers et al., 1999). There is evidence that individuals with BED have similar levels of cognitive distortion to non-eating disordered groups (e.g., Kuehnel & Wadden, 1994).

Cognitive distortions relating to food and body have been reported to be elevated in individuals with BN (e.g., Bonifazi & Crowther, 1996; Cooper et al.,

1998; Dritschel et al., 1991), and individuals with BED (e.g., Eldredge & Agras, 1996; Marcus et al., 1992; Spitzer et al., 1993). For individuals with BED, these distortions have been reported to be specific to eating behaviour (Hunt & Rosen, 1981). Dysfunctional cognitions have been thought to have a causal role in the maintenance of disturbed eating behaviour in BN (Lingswiler et al., 1989).

Methodologically, it is difficult to examining changes in cognitions across a binge eating episode. The use of guided imagery offers an approach for examining changes across a discrete event, and has been used to examine a number of unique events, such as traumatic experience (e.g., Holmes et al., 2001) or homicide (e.g., Williams & Haines, 2001; Williams et al., 2000), or events that are logistically difficult or ethically improper to examine by any other means, such as self-mutilation (e.g., Brain et al., 1998, 2002; Haines et al., 1995). The rationale for the use of guided imagery was provided in more detail in Chapter 9.

Given that both BN and BED have been reported to have distorted cognitions with regard to food and body, it would be important to distinguish any differences between them in terms of intensity, and to assess whether these cognitions change across a binge eating episode, or whether they remain constant. The aim of this study was to assess general cognitive distortions for BN, BED, OW and NW groups. Further, the aim was to assess specific cognitions relating to food and body in relation to changes across a binge episode, normal meal and neutral event.

A series of hypotheses was formulated on the basis of the previously presented literature review. It was hypothesised that the level of general cognitive distortion will be elevated for the BN group in comparison to other groups, and elevated for the BED group in comparison to the OW and NW

groups. For specific cognitive distortions, the BN and BED group will endorse these more strongly in relation to the binge eating script, compared to the normal eating and neutral scripts. They will also have elevated specific cognitive distortions (regarding food and body) than the NW and OW groups.

Given that cognitive distortions are thought to maintain the binge eating behaviour, it is hypothesised that the intensity of the specific cognitive distortions across the binge eating episode will vary for the BN and BED groups. Cognitions regarding food and body will be elevated for the BN and BED groups prior to engaging in binge eating behaviour, as there is evidence to suggest that individuals are aware that they are going to engage in the binge eating behaviour. In terms of general cognitive distortion, the BED group will more similar to the OW group than the BN group, but for specific cognitive distortions, the BED group will be more similar to the BN group than the OW group.

11.2 METHOD

11.2.1 Participants

The fifty-nine people who participated in the first study completed the present investigation.

11.2.2 Materials

General Cognitive Distortions

The Dysfunctional Attitudes Scale (DAS; Weissman, 1979) is a 40-item self report inventory assessing irrational attitudes, and can be seen in Appendix N. It was developed utilising Beck's model of depression (Beck et al., 1979). Items reflect the themes of "approval, love, achievement, perfectionism,

entitlement, omnipotence and autonomy" (Parker, Bradshaw, & Blignault, 1984, p. 94). Each statement is read by the participant and rated on a scale of 1 to 7, whether they agree of disagree. A score of 1 being "disagree totally", 4 being "neutral" and 7 being "agree totally".

The scales are designed to assess the extent to which individuals tend to misinterpret specific events in terms of personal failure, deprivation or rejection, and to what extent they exaggerate and overgeneralise negative information about themselves (Lazarus & Galassi, 1994). The scale has shown high internal consistency (coefficient alpha = .93), good six-week test-retest reliability (.71), and good validity, correlating with other depression measures (Oliver & Baumgart, 1985).

The Beliefs Inventory (Davis, Eshelman, & McKay, 1995) is a 100-item self-report inventory in a modified form of the Irrational Beliefs Test (Jones, 1968), and can be seen in Appendix O. The Beliefs Inventory assesses ten irrational beliefs based on Ellis's model of depression (Ellis & Harper, 1975). The participant reads each statement and marks whether they agree or disagree with it. Ellis identified ten basic irrational ideas, and the inventory indicates to what degree the individual agrees with the irrational belief. It is recognised that further psychometric assessment is required for all measures of irrational beliefs, however, this and other measures all have excellent face validity (Woodward, Carless, & Findlay, 2001). The ten irrational beliefs can be seen in Table 23.

Table 23.

Subscales of the Beliefs Inventory based on the ten basic irrational beliefs as suggested by Ellis (1965) (adapted from Davis et al., 1995).

Belief	Thematic Content
Approval	It is absolutely necessary for an adult to have love and approval from peers, family and friends.
Competence	You must be unfailingly competent and almost perfect in all you undertake.
Guilt	Certain people are evil, wicked, and villainous, and should be punished.
Demand own way	It is horrible when people and things are not the way you would like them to be
Misery external	External events cause most human misery – people simply react as events trigger their emotions.
Fear of unknown	You should feel fear or anxiety about anything that is unknown, uncertain, or potentially dangerous.
Avoidance	It is easier to avoid than face life's difficulties and responsibilities.
Dependence	You need something other or stronger or greater than yourself to rely on.
Predetermination	The past has a lot to do with determining the present.
Low effort	Happiness can be achieved by inaction, passivity, and endless leisure.

Changes in Cognitions

Visual Analogue Scales (VASs) (McCormack et al., 1988) were used to measure change in participants cognitions at different stages and across different scenes (binge eating/overeating, normal eating, and neutral). The VASs were developed based on the BCI (Zotter & Crowther, 1991), and are presented in

Appendix P. The BCI is a 12-item measure that is made up of three groups of self-statements: food and eating; weight and body image; and self-efficacy and need for approval. Each group includes at least one distorted cognition and at least one cognition characterised by negative affect. The BCI was found to be a useful instrument for measuring targeted cognitions in vivo. The BCI was able to distinguish women with BN from those who do not have an eating disorder. The scores (from 0 to 100) represented the degree to which the participants agreed or disagreed with the statements. A higher score indicated a more negative response. The statements can be seen in Table 24.

Table 24.

Cognitive statements for the VASs (based on the BCI; Zotter & Crowther, 1991).

Statements
Things are going well with my eating.
I should not have eaten that.
Food is my only comfort.
I have already eaten too much, so I might as well eat more.
I feel good about my appearance.
I do not like the way I look.
I'm fat: I must lose weight.
I wish I could eat and not gain weight.
I am pleased with the way things are going.
I am disappointed in myself.
I have no self control.
I want everyone to like me

11.2.3 Procedure

The participants completed the DAS and the Beliefs Inventory in their own time. The interview procedure to obtain information for the imagery scripts was the same as for Chapter 9. Participants completed the VASs for cognitive responses during the laboratory session where psychophysiological recordings were taken. The cognitive VASs were completed at the end of each script. A detailed description of imagery scripts and presentation is provided in Chapter 9.

11.2.4 Design and Analysis Strategy

The first part of the study compared four groups (BN, BED, NW, OW) on the Beliefs Inventory and DAS. Selection of the BN and BED groups was based on clinical diagnoses. Dependent variables were responses to the self-report inventories. One way ANOVAs using SPSS were employed to analyse the data. Student-Newman-Kuels, at the 0.05 level of significance, post hoc analyses were used to examine between group differences where ANOVA produced a significant F value.

The second part of the study utilised VASs and had a 4 (group: BN, BED, NW, and OW) by 3 (script: binge eating, normal eating, and neutral) by 5 (stages: setting the scene, approach, incident, resolution and consequence) mixed factorial design with repeated measures. Dependent variables were responses to the VAS scales. The data was analysed using a repeated measures ANOVA was performed using SPSS. Due to the violation of the assumption of sphericity, a Huynh-Feldt correction was utilised (Maxwell & Delaney, 1989).

Newman-Keuls post hoc analyses were used to examine between group differences were used where ANOVA produced a significant F value, using Statisica: Version six.

11.3 RESULTS

The results from the one way and repeated measures ANOVAs for Chapter 10 are presented in Appendix Q.

11.3.1 Self-Report Inventories

Beliefs Inventory. The means and standard deviations each group on the subscales of the Beliefs Inventory can be seen in Table 25.

Table 25.

Mean scores and standard deviations for the subscales of the Beliefs Inventory for the BN, BED, OW and NW groups.

BELIEF	BN		BED		OW		NW	
	M	*SD*	*M*	*SD*	*M*	*SD*	*M*	*SD*
Approval	7.00	2.52	5.89	3.07	3.47	3.09	4.71	3.41
Competence	5.71	2.22	5.72	2.47	3.88	2.40	4.12	3.06
Guilt	5.57	1.27	4.50	1.65	4.53	2.58	4.82	1.91
Demand own way	5.00	2.77	6.39	2.00	3.76	2.02	4.41	2.50
Misery external	4.43	2.37	4.89	1.91	3.59	2.09	4.82	2.16
Fear of unknown	6.57	2.07	5.89	2.35	3.65	3.48	4.71	2.47
Avoidance	5.00	2.31	5.50	1.76	4.35	2.09	4.94	2.28
Dependence	4.71	2.63	4.22	2.02	4.65	1.94	5.35	1.66
Predetermination	4.14	0.90	4.94	2.31	3.06	2.05	3.00	2.15
Low effort	4.14	2.67	3.72	1.45	4.12	1.97	4.35	2.09

Significant differences were found between groups on the beliefs Approval, Demand own way, and Fear of unknown. F-values and significant differences can be seen in Table 26.

Table 26.

Significant differences between groups on the Beliefs Inventory.

Belief	*F*(3,55)	*MSE*	*p* value	Differences
Approval	2.86	27.81	0.045	BN>OW
Demand own way	4.33	21.98	0.008	BED>OW
Fear of unknown	2.86	21.36	0.045	BN>OW

From the post hoc analysis, the BN group had a significantly higher score than the OW group for the beliefs Approval and Fear of the Unknown. The BED group scored significantly higher than the OW group for the belief Demand own way.

Dysfunctional Attitudes Scale. For the DAS, there was a trend for a significant difference between groups, $F(3,55) = 2.45$, $MSE = 2584.20$, $p < 0.08$. The means and standard deviations can be seen in Table 27.

Table 27.

Mean scores and standard deviations for the BN, BED, OW and NW groups on the DAS.

	BN		BED		NW		OW	
	M	*SD*	*M*	*SD*	*M*	*SD*	*M*	*SD*
DAS	138.29	32.74	136.11	32.71	117.18	34.97	110.94	29.43

From Table 27, it can be seen that the BN group had the highest score on the DAS, followed by the BED group. The OW group had the lowest mean score.

11.3.2 Cognitive response to imagery

The means and standard deviations for each group on all the VASs can be seen in Appendix R.

Script x Stage x Group Interactions. There were significant script by stage by group interactions for the VASs "I should not have eaten that", $F(12.36,230.75) = 1.98$, $MSE = 1053.89$, $p = 0.03$; "I have already eaten too much, so I may as well eat more", $F(13.44,250.82) = 2.70$, $MSE = 1275.05$, $p = 0.001$; and "I am disappointed with myself", $F(13.83,258.20) = 1.93$, $MSE = 652.79$, $p = 0.03$. .

For the VAS "I should not have eaten that" the interaction is presented in Figure 24.

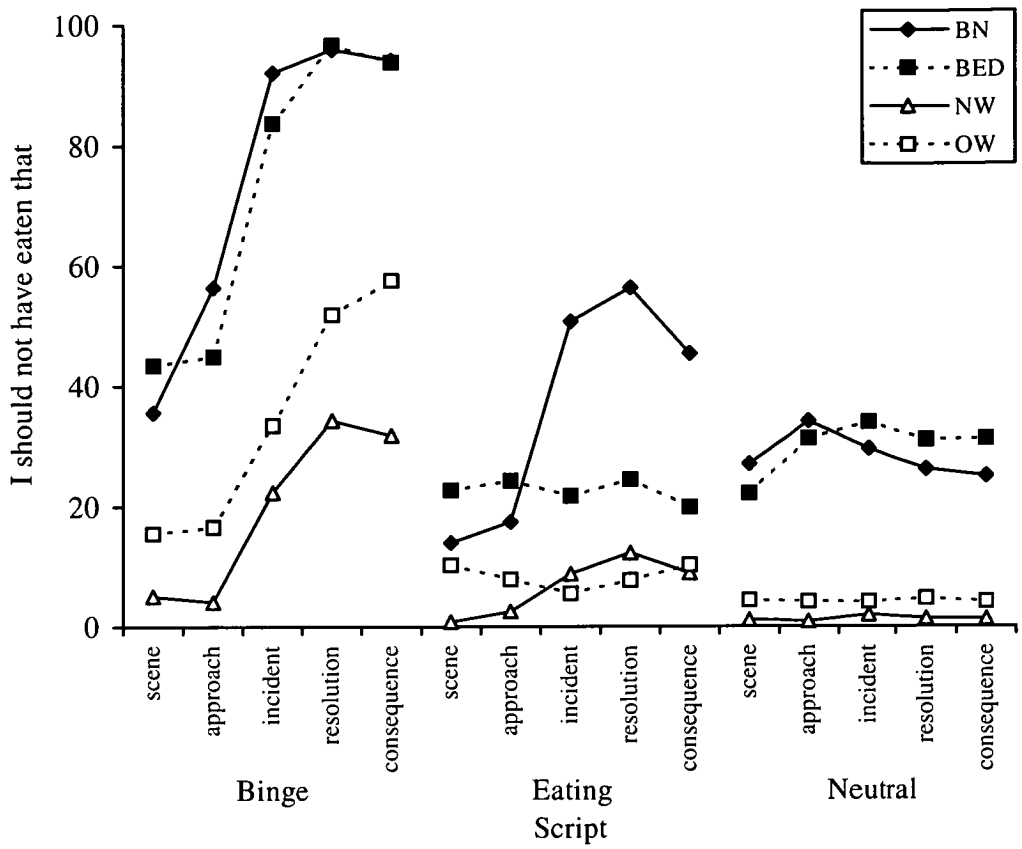

Figure 24. The mean ratings for the VAS "I should not have eaten that", for each of the four groups at each stage of each script.

When considering the VAS "I have already eaten too much, so I may as well eat more", the interaction can be seen below in Figure 25.

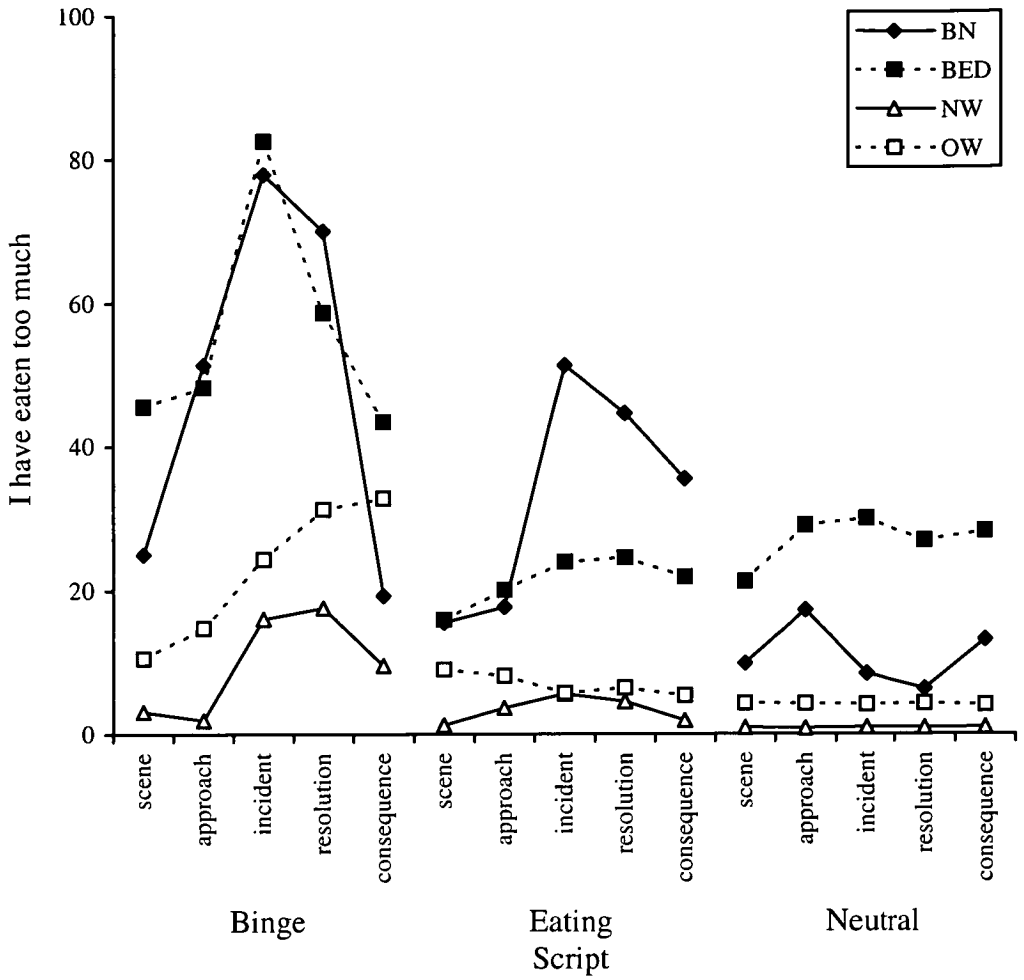

Figure 25. The mean ratings for the VAS "I have already eaten too much, so I may as well eat more" for each of the four groups at each stage of the three scripts.

Figure 26 presents the interaction for VAS "I am disappointed with myself".

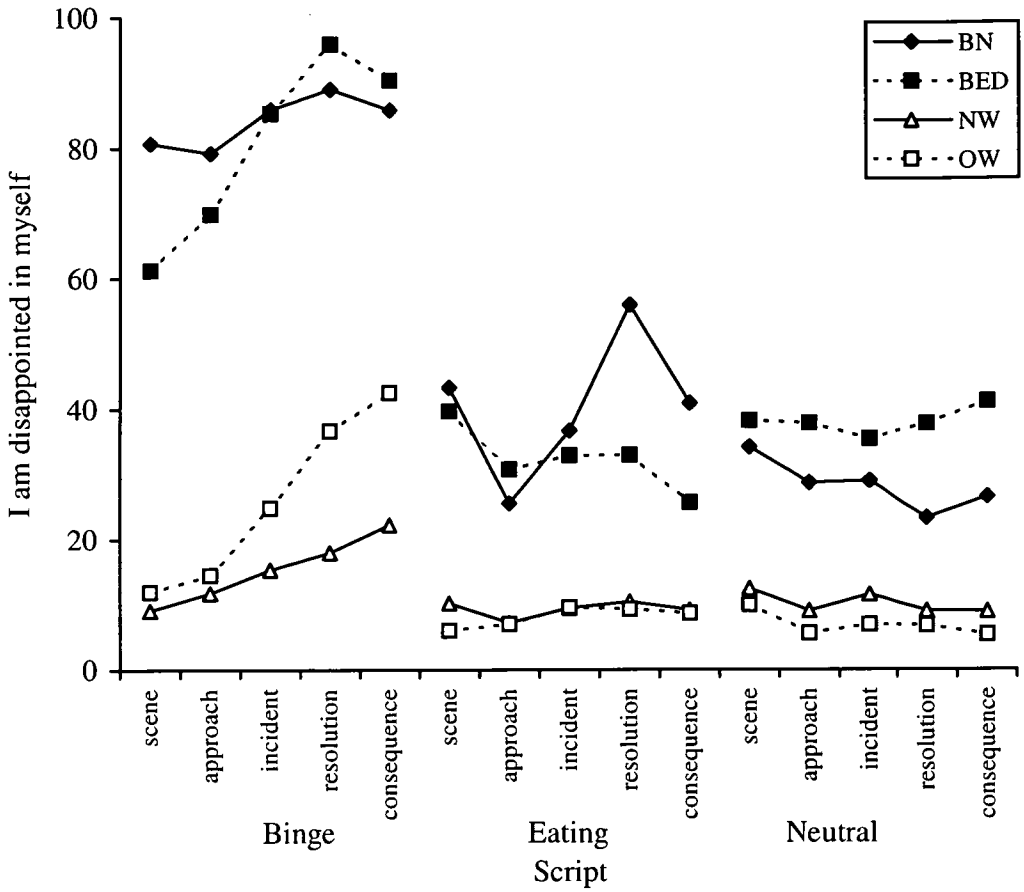

Figure 26. The mean ratings for the VAS "I am disappointed in myself" for each group at each stage of the three scripts.

Consideration was given to the script by stage interactions for each group separately.

Bulimia Group

Table 28 presents the results of the post hoc analyses for the comparisons between scripts at each stage for each of the VASs for the BN group.

Table 28.

Post hoc analysis results for comparisons between scripts at each stage for each of the VASs for the BN group.

VAS	STAGE				
	Scene	Approach	Incident	Resolution	Conseq
I should not have eaten that	ns	B>E, N	B>E, N	B>E, N E>N	B>E, N
I have already eaten too much, so I may as well eat more	ns	B>E, N	B>E, N E>N	B>E, N E>N	ns
I am disappointed in myself	B>E, N	B>E, N	B>E, N	B>E, N E>N	B>E, N

Table 29 presents the comparisons across the stages of each script for each of the VASs for the BN group.

Table 29.

The across stage comparison results for each script for each VAS for the BN group.

VAS	Script	Differences between Stages
I should not have eaten that	Binge	Scene<Approach, incident, resolution, consequence Approach<Incident, resolution, consequence
	Eating	Scene< Incident, resolution, consequence Approach<Incident, resolution, consequence
	Neutral	ns
I have already eaten too much, so I may as well eat more	Binge	Scene<Approach, incident, resolution Approach<Incident, resolution, consequence Incident<Consequence Resolution<Consequence
	Eating	Scene<Incident, resolution Approach<Incident, resolution
	Neutral	ns
I am disappointed in myself	Binge	ns
	Eating	Approach<Resolution Incident<Resolution
	Neutral	ns

For the VAS "I should not have eaten that" there was a significant difference between scripts at the approach, incident, resolution, and consequence stages. The binge eating related script had a significantly higher response than the normal eating related script and neutral script for the approach, incident, resolution and consequence stages. Additionally, the normal eating related script had a significantly higher response than the neutral script at the resolution stage.

When considering changes across scripts, for the binge eating and normal eating related scripts, the setting the scene and approach stages were rated significantly lower than the incident, resolution and consequence stages. Further, for the binge eating script, the setting the scene stage was rated significantly lower than the approach stage.

When considering the VAS "I have already eaten too much, so I may as well eat more", there was a significant difference between scripts at the approach, incident, and resolution stages. The binge eating related script had a significantly higher response than the normal eating and neutral scripts at the approach, incident and resolution stages. Additionally, for the incident and resolution stages, the normal eating script had a significantly higher response than the neutral script. When looking at the binge eating related script, there were significant changes across the script. For the binge eating script, the setting the scene stage was rated significantly lower than the approach, incident and resolution stages, the approach was rated significantly lower than the incident, resolution and consequence stages, and the incident and resolution stages were rated significantly lower than the consequence stage. Furthermore, there were significant changes across the normal eating related script. Post hoc analysis revealed that the setting the scene and approach stages were rated significantly lower than the incident and resolution stages. There were no significant differences across the neutral script.

For the VAS "I am disappointed in myself" there was a significant difference between scripts at the setting the scene, approach, incident, resolution, and consequence stages. The binge eating related script had a significantly higher response than the normal eating and neutral scripts at all stages. There

were no significant changes across the binge eating related script or the neutral script. However, there were significant changes across the normal eating related script. Post hoc analysis revealed that the resolution stage was rated significantly higher than the approach and incident stages.

Binge Eating Disorder Group

Table 30 presents the results of the post hoc analyses for the comparisons between scripts at each stage for each of the VASs for the BED group.

Table 30.

Post hoc analysis results for comparisons between scripts at each stage for each of the VASs for the BED group.

VAS	STAGE				
	Scene	Approach	Incident	Resolution	Conseq
I should not have eaten that	ns	ns	B>E, N	B>E, N	B>E, N
I have already eaten too much, so I may as well eat more	B>E	B>E	B>E, N	B>E, N	B>E
I am disappointed in myself	B>E, N	B>E, N	B>E, N	B>E, N	B>E, N

Table 31 presents the comparisons across the stages of each script for each of the VASs for the BED group.

Table 31.

The across stage comparison results for each script for each VAS for the BED group.

VAS	Script	Differences between Stages
I should not have eaten that	Binge	Scene<Incident, resolution, consequence Approach<Incident, resolution, consequence
	Eating	ns
	Neutral	ns
I have already eaten too much, so I may as well eat more	Binge	Incident>Scene, approach, resolution, consequence
	Eating	ns
	Neutral	ns
I am disappointed in myself	Binge	Scene<Incident , resolution, consequence Approach< Incident , resolution, consequence
	Eating	ns
	Neutral	ns

For the VAS "I should not have eaten that" there was a significant difference between scripts at the incident, resolution, and consequence stages. The binge eating related script had a significantly higher response than the normal eating and neutral scripts at all of these stages. When examining changes across the binge eating related script, post hoc analysis revealed that the setting the scene and approach stages were rated significantly lower than the incident, resolution and consequence stages.

When considering the VAS "I have already eaten too much, so I may as well eat more", there was a significant difference between scripts at all stages.

The binge eating related script had a significantly higher response than the normal eating and neutral scripts at the incident and resolution stages. At the setting the scene, approach and consequence stages, the binge eating script was rated significantly higher than the normal eating script. When examining changes across the three scripts, there were significant changes across the binge eating related script. Post hoc analysis revealed that the setting the scene, approach, resolution and consequence stages were rated significantly lower than the incident stage.

For the VAS "I am disappointed with myself" there was a significant difference between scripts at all stages, with the binge eating related script had a significantly higher response than the normal eating and neutral scripts. When examining changes across the three scripts, there were significant changes across the binge eating related script. Post hoc analysis revealed that the setting the scene and approach stages were rated significantly lower than the incident, resolution and consequence stages.

Overweight Group

Table 32 presents the results of the post hoc analyses for the comparisons between scripts at each stage for each of the VASs for the OW group.

Table 32.

Post hoc analysis results for comparisons between scripts at each stage for each of the VASs for the OW group.

VAS	STAGE				
	Scene	Approach	Incident	Resolution	Conseq
I should not have eaten that	ns	ns	B>E, N	B>E, N	B>E, N
I have already eaten too much, so I may as well eat more	ns	ns	ns	B>E, N	B>E, N
I am disappointed in myself	ns	ns	B>N	B>E, N	B>E, N

Table 33 presents the comparisons across the stages of each script for each of the VASs for the OW group.

Table 33.

The across stage comparison results for each script for each VAS for the OW group.

VAS	Script	Differences between Stages
I should not have eaten that	Binge	Scene<Resolution, consequence Approach<Resolution, consequence Incident<Consequence
	Eating	ns
	Neutral	ns
I have already eaten too much, so I may as well eat more	Binge	Scene<Resolution
	Eating	ns
	Neutral	ns
I am disappointed in myself	Binge	Scene<Resolution, consequence Approach<Resolution, consequence
	Eating	ns
	Neutral	ns

For the VAS "I should not have eaten that" there were significant differences between scripts at the incident, resolution, and consequence stages. At each of these stages, the binge eating related script was rated significantly higher than the normal eating related script and the neutral script. When looking at changes across the stages of each script, for the binge eating related script, there were significant differences across the stages. The setting the scene stage and approach stages were rated significantly lower than the resolution and consequence stages. Additionally, the incident stage was rated significantly lower than the consequence stage.

When considering the VAS "I have already eaten too much, so I may as well eat more" there were significant differences between scripts at the resolution and consequence stages. At each of these stages, the binge eating related script was rated significantly higher than the normal eating related script and the neutral script. When looking at changes across the stages of each script, for the binge eating related script there were significant differences across the stages. The setting the scene stage was rated significantly lower than the resolution stage.

For the VAS "I am disappointed with myself" there were significant differences between scripts at the incident, resolution, and consequence stages. At each of these stages, the binge eating related script was rated significantly higher than the neutral script. Further, for the resolution and consequence stages, the binge eating script was rated significantly higher than the normal eating script. For the binge eating related script, there were significant differences across the stages. The resolution and consequence stages were rated significantly higher than the setting the scene and approach stages.

Normal Weight Group

Table 34 presents the results of the post hoc analyses for the comparisons between scripts at each stage for each of the VASs for the NW group.

Table 34.

Post hoc analysis results for comparisons between scripts at each stage for each of the VASs for the NW group.

VAS	STAGE				
	Scene	Approach	Incident	Resolution	Conseq
I should not have eaten that	ns	ns	ns	B>N	B>N
I have already eaten too much, so I may as well eat more	ns	ns	ns	ns	ns
I am disappointed in myself	ns	ns	ns	ns	ns

Table 35 presents the comparisons across the stages of each script for each of the VASs for the NW group.

Table 35.

The across stage comparison results for each script for each VAS for the NW group.

VAS	Script	Differences between Stages
I should not have eaten that	Binge	Scene<Resolution, consequence Approach<Resolution, consequence
	Eating	ns
	Neutral	ns
I have already eaten too much, so I may as well eat more	Binge	ns
	Eating	ns
	Neutral	ns
I am disappointed in myself	Binge	ns
	Eating	ns
	Neutral	ns

For the VAS "I should not have eaten that" there were significant differences between scripts at the resolution, and consequence stages. The binge eating related script was rated significantly higher than the neutral script for each of these stages. When looking at changes across each of the three scripts, there were significant changes across the binge eating related script. The resolution and consequence stages were rated significantly higher than the setting the scene and approach stages.

When considering the VAS "I have already eaten too much, so I may as well eat more" and the VAS "I am disappointed with myself" there were no significant differences between scripts or across stages.

Script x Stage Interactions. There were significant script by stage interactions for the VASs "I wish I could eat and not gain weight", "I am pleased with the way things are going", "I'm fat, I must lose weight", "I do not like the way I look", "things are going well with my eating", and "I have no self control". The ANOVA results can be seen in Table 36.

Table 36.

ANOVA results for the VASs with significant script by stage interactions.

VAS	*F* value	df	*MSE*	*p*
I wish I could eat and not gain weight	2.33	5.2, 292.3	344.92	0.040
I am pleased with the way things are going	3.67	5.5, 312.1	830.96	0.002
I'm fat, I must lose weight	2.98	4.6, 255.4	570.07	0.015
I do not like the way I look	3.15	5.7, 318.4	603.70	0.006
things are going well with my eating	6.22	4.4, 248.0	1811.33	0.000
I have no self control	5.44	4.8, 270.4	1405.70	0.000

The post hoc analyses comparing the scripts at each stage for these VAS are presented below in Table 37.

Table 37.

Post hoc analyses results for the significant comparisons between scripts at each stage of the cognitive VAS.

VAS	Scene	App	STAGE Incident	Res	Cons
I wish I could eat and not gain weight	B>N	B>N	B>E, N	B>E, N	B>E, N
I am pleased with the way things are going	B>E, N	B>E, N	B>E, N	B>E, N	B>E, N
I am fat, I must lose weight	ns	ns	B>E, N	B>E, N	B>E, N
I do not like the way I look	B>E	B>E	B>E, N	B>E, N	B>E, N
Things are going well with my eating	B>E, N	B>E, N	B>E, N	B>E, N	B>E, N
I have no self-control	B>E, N	B>E, N	B>E, N	B>E, N	B>E, N

Further, the post hoc analyses results for the comparison across consecutive stages of the binge eating script are presented in Table 38. There were no significant differences across consecutive stages of the normal eating and neutral scripts.

Table 38.

Post hoc analyses results comparing differences across consecutive stages of the binge eating script for the cognitive VAS.

VAS	Binge Eating Script
I wish I could eat and not gain weight	Res>Cons
I am pleased with the way things are going	App<Inc, Res>Cons
I am fat, I must lose weight	App<Inc, Inc<Res
I do not like the way I look	App<Inc
Things are going well with my eating	App<Inc, Inc<Res
I have no self-control	Scene<App, App<Inc

The post hoc analyses show that, in general, the binge eating related script was rated significantly higher than the normal eating and neutral scripts at all stages for all VASs. Further, when examining consecutive changes across the scripts, there were only significant differences across the binge eating related script. The most common change found was an increase from the approach to the incident stage. Additionally, increases from the incident to the resolution, and decreases from the resolution to the consequence were also revealed. Significant changes relating to each VAS individually are discussed below.

The interaction for the VAS "I wish I could eat and not gain weight" can be seen in Figure 27.

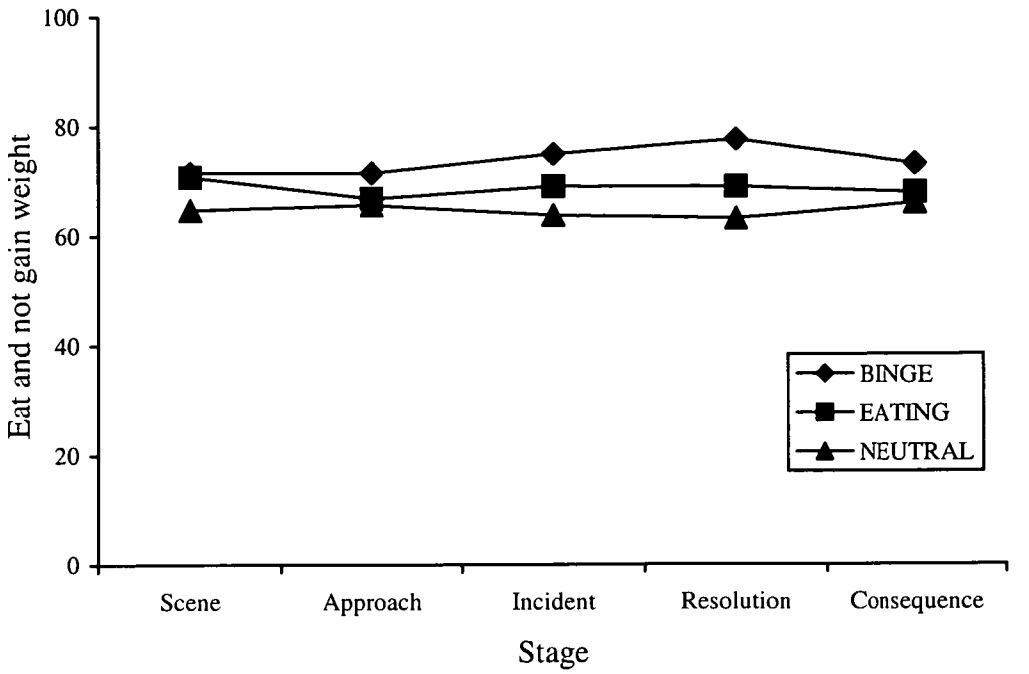

Figure 27. The mean ratings for the VAS "I wish I could eat and not gain weight" for the three scripts across each of the five stages.

At the setting the scene and approach stages the binge eating related script was rated significantly higher than the neutral script. At the incident, resolution and consequence stages the binge eating related script was rated significantly higher than the normal eating and neutral scripts. Further, there were significant changes across the stages of the binge script, with a significant decrease from the resolution to the consequence stage.

Figure 28 presents this interaction for the VAS "I am pleased with the way things are going".

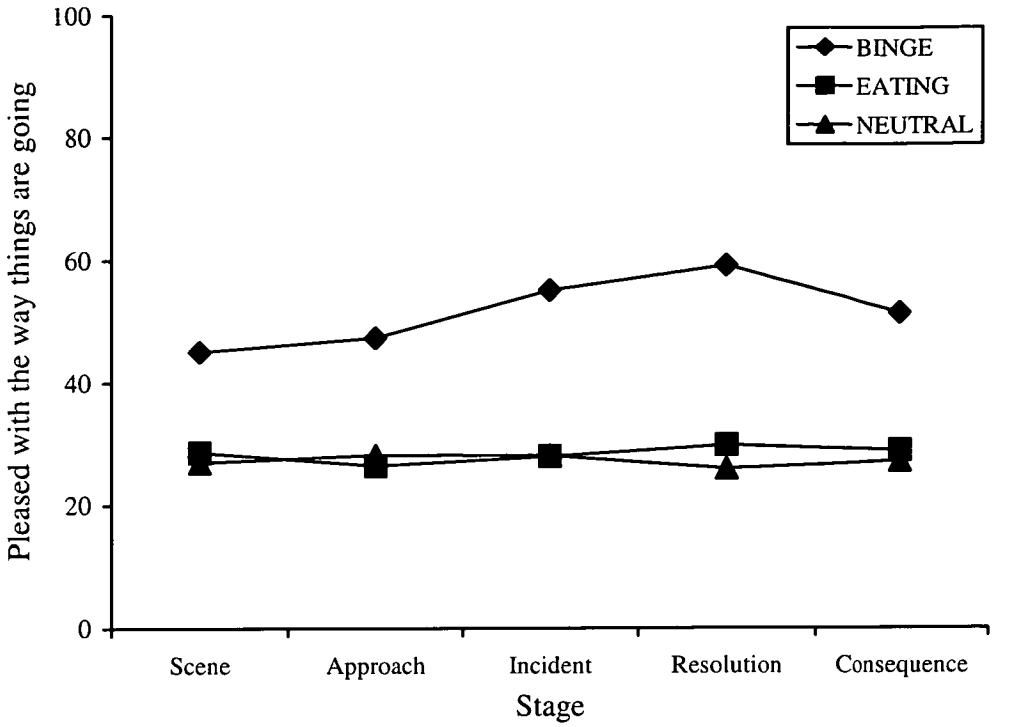

Figure 28. The mean ratings for the VAS "I am pleased with the way things are going" for the three scripts across each of the five stages.

There was a significant difference between the three scripts at each of the five stages, with the binge eating related script being significantly higher than the normal eating and neutral scripts for each of these stages. Further, there were significant changes across the stages of the binge script, with ratings increasing significantly from the approach to the incident stage, and decreasing significantly between the resolution and consequence stages.

The VAS "I'm fat, I must lose weight" is presented in Figure 29.

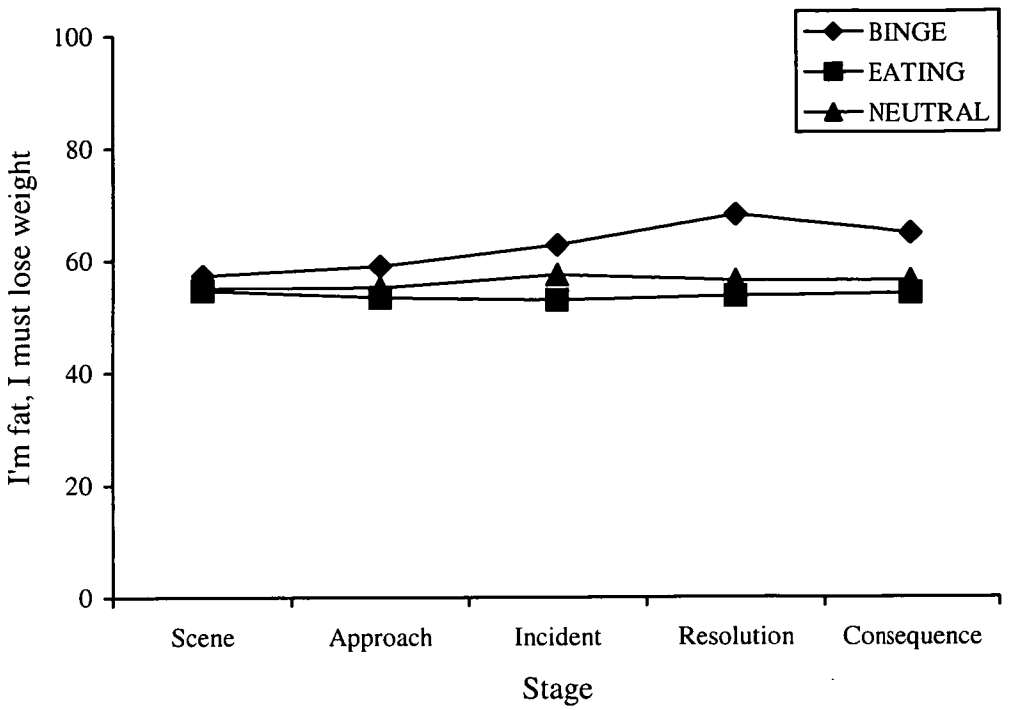

Figure 29. The mean ratings for the VAS "I'm fat, I must lose weight" for the three scripts across each of the five stages.

There was a significant difference between the three scripts, with the binge eating related script being significantly higher than the normal eating and neutral scripts for each of the stages. Further, there were significant changes across the stages of the binge script, with ratings increasing significantly from the approach to the incident, and the incident to the resolution stage.

The interaction for the VAS, "I do not like the way I look" can be seen in Figure 30.

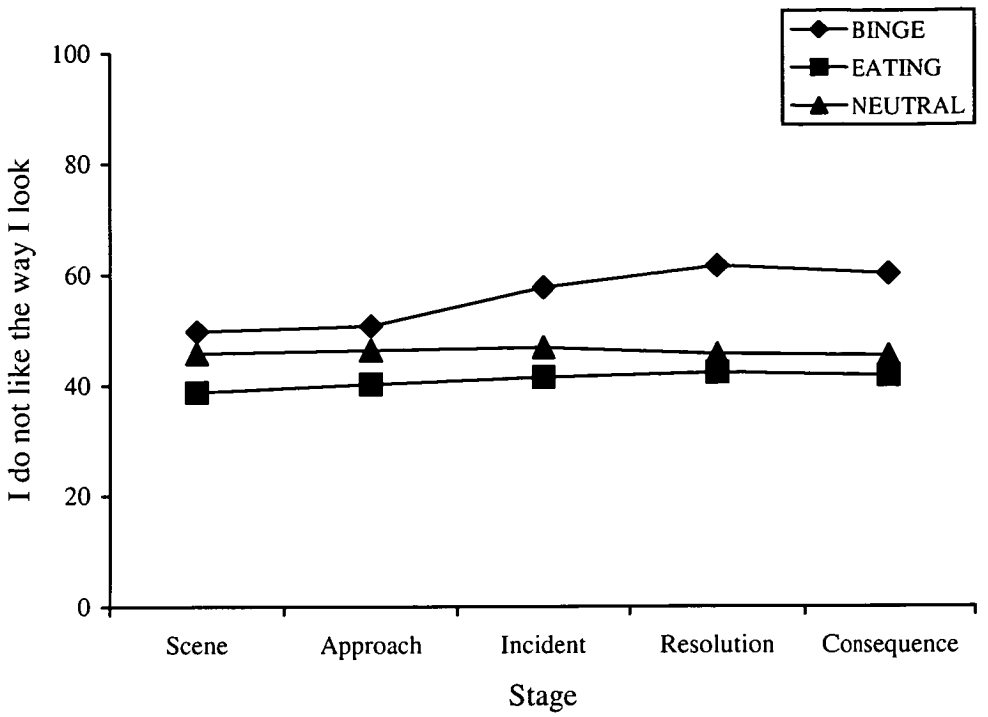

Figure 30. The mean ratings for the VAS "I do not like the way I look", for the three scripts across the five stages.

There was a significant difference between the three scripts at all stages, with the binge eating script being significantly higher than the normal eating at the setting the scene and approach stages. At the incident, resolution and consequence stages, the binge eating related script was rated significantly higher than the normal eating and neutral scripts. Additionally, there were significant changes across the stages of the binge script, with ratings increasing significantly from the approach to the incident stage.

Figure 31 presents the interaction for the VAS "things are going well with my eating".

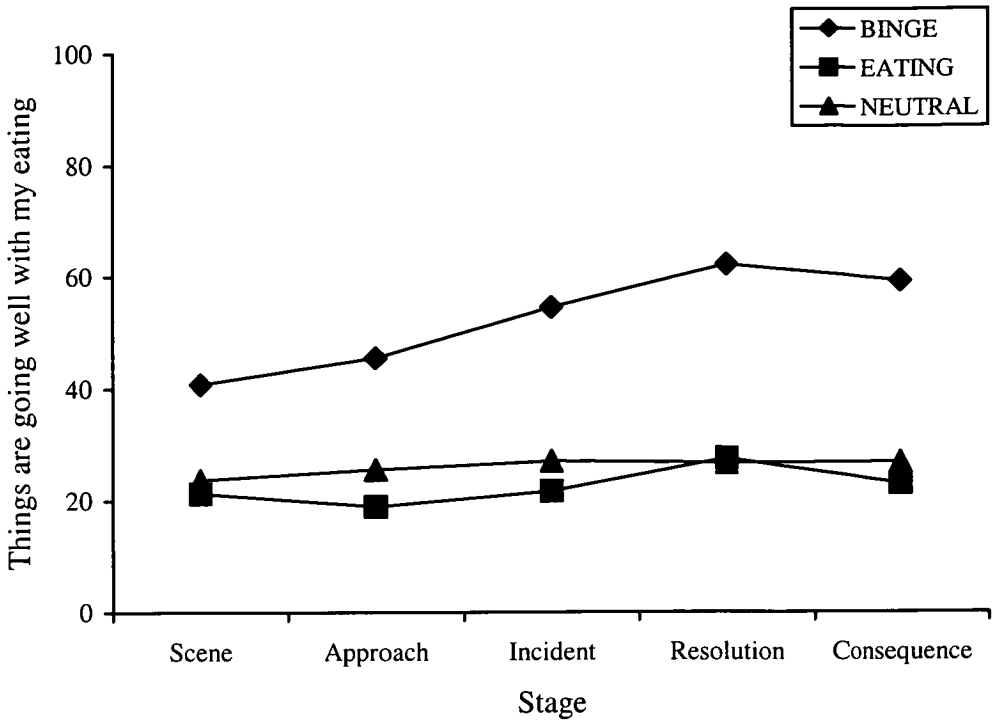

Figure 31. Mean ratings for the VAS "things are going well with my eating" for the three scripts across each of the five stages.

There was a significant difference between the three scripts at all stages, with the binge eating related script being significantly higher than the normal eating and neutral scripts at all stages. Further, there were significant changes across the stages of the binge script, with ratings increasing significantly from the approach to the incident, and incident to the resolution stage.

For the VAS "I have no self control", the interaction is presented in Figure 32.

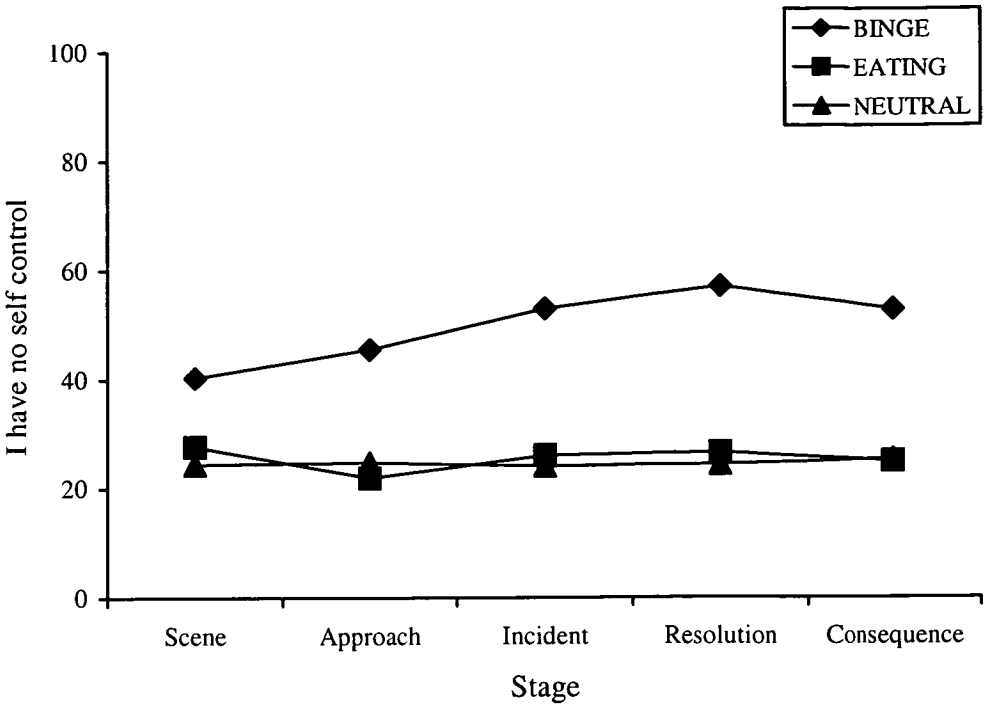

Figure 32. The mean ratings for the VAS "I have no self control" for each of the three scripts on each of the five stages.

There was a significant difference between the three scripts at all stages, with the binge eating related script being significantly higher than the normal eating and neutral scripts at all stages. Additionally, there were significant changes across the stages of the binge script, with ratings increasing significantly from the setting the scene to the approach stage, and from the approach to the incident stage.

Script x Group Interactions. There were significant script by group interactions for the VASs "I feel good about my appearance", "food is my only comfort", "I am pleased with the way things are going", "I'm fat, I must lose weight", "I do not like the way I look", "things are going well with my eating", and "I have no self control". The ANOVA results can be seen in Table 39.

Table 39.

ANOVA results for the VASs with significant script by group interactions.

VAS	*F* value	df	*MSE*	*p*
I feel good about my appearance	4.26	6.0, 112.0	3194.90	0.001
Food is my only comfort	5.07	5.6, 105.0	4981.45	0.000
I am pleased with the way things are going	11.73	5.9, 109.8	8928.40	0.000
I'm fat, I must lose weight	2.26	6.0, 112.0	1279.93	0.042
I do not like the way I look	3.70	6.0, 112.0	2446.96	0.002
Things are going well with my eating	8.44	6.0, 112.0	9530.29	0.000
I have no self control	11.16	5.2, 97.4	10483.30	0.000

The post hoc analysis results comparing each script for each of the VASs are presented here. Table 40 contains the results for the comparisons between groups for each script. Table 41 shows the comparisons between scripts for each of the four groups.

Table 40.

Post hoc results for the comparison between groups for each script for each of the VASs.

VAS	SCRIPT		
	Binge	Eating	Neutral
I feel good about my appearance	BN, BED >NW	ns	ns
Food is my only comfort	BN, BED >OW, NW	BN>OW, NW	BN>NW
I am pleased with the way things are going	BN, BED>OW, NW	ns	ns
I'm fat, I must lose weight	BN, BED>NW	BN, BED>NW	BN, BED>NW
I do not like the way I look	BN, BED>NW BN>OW	ns	ns
Things are going well with my eating	BN, BED>OW, NW	ns	BN, BED>OW, NW
I have no self control	BN, BED>OW, NW	BN> OW, NW	BED> OW, NW

Table 41.

Post hoc analyses results comparing the ratings for the emotional VASs between each script for each group.

VAS	GROUP			
	BN	BED	OW	NW
I feel good about my appearance	B>E, N	B>E, N	B>E	ns
Food is my only comfort	B>E, N	B>E, N	ns	ns
I am pleased with the way things are going	B>E, N	B>E, N	B>E, N	ns
I'm fat, I must lose weight	B>E	B>E, N	ns	ns
I do not like the way I look	B>E, N	B>E, N	B>E	ns
Things are going well with my eating	B>E, N	B>E, N	B>E, N	ns
I have no self control	B>E, N	B>E, N	B>E, N	ns

The theme that was found through the script by group interactions was that in general, the binge script was rated higher than the normal eating and neutral scripts for the BN and BED groups. Further, in most cases the binge script was rated higher than normal eating for the OW group. On the whole, the BN and BED groups rated the binge eating script significantly higher than the OW and NW groups. A higher score indicates a higher degree of dysfunction in cognitions. The cognitive responses are presented below individually.

The script by group interaction for the VAS "I feel good about my appearance" is presented in Figure 33.

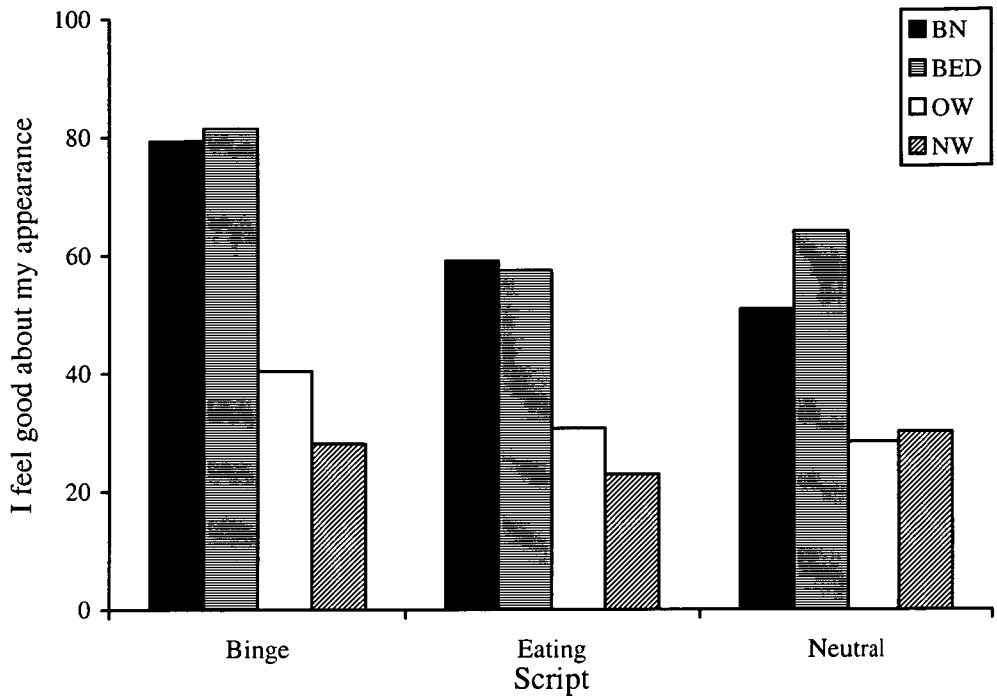

Figure 33. The mean ratings for the VAS "I feel good about my appearance" for each script for each of the four groups.

Post hoc analysis shows that in relation to the binge eating script, the BN and BED groups rated their response significantly higher than the NW group. Further, the binge script was rated significantly higher than the eating and neutral scripts for the BN and BED groups.

For the VAS "food is my only comfort" the interaction can be seen in Figure 34.

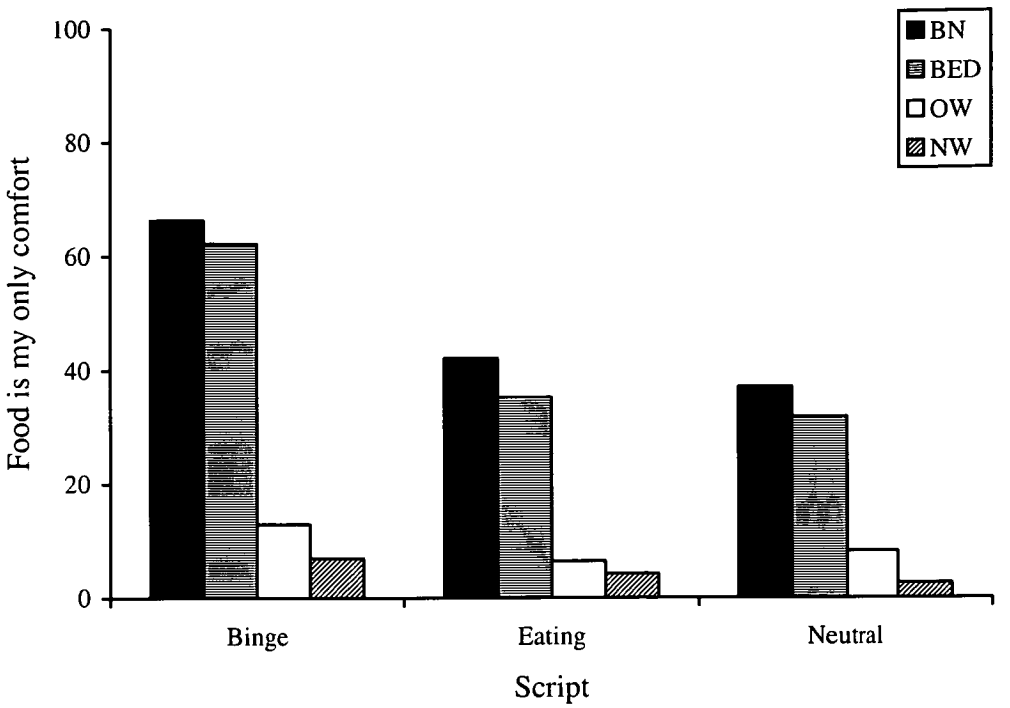

Figure 34. The mean ratings for the VAS "food is my only comfort" for each script for each of the four groups.

From the post hoc analysis, the binge eating script was rated significantly higher than the normal eating and neutral scripts for the BN and BED groups. Additionally, for the binge eating script, the BN and BED groups rated their responses significantly higher than the OW and NW groups. The BN group responded significantly higher than the OW and NW groups on the normal eating script, and higher than the NW group on the neutral script.

The interaction for the VAS "I am pleased with the way things are going" is presented in Figure 35.

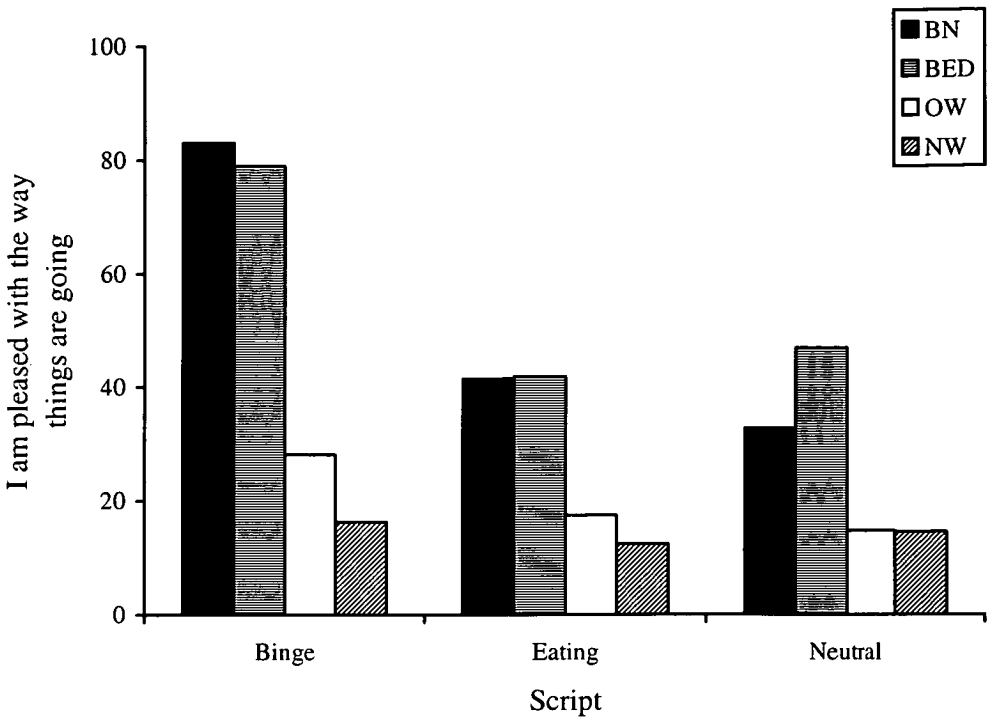

Figure 35. The mean ratings for the VAS "I am pleased with the way things are going" for each script for each of the four groups.

From the post hoc analysis, the binge eating script was found to be rated significantly higher than the normal eating and neutral scripts for the BN, BED, and OW groups. Additionally, for the binge eating script, the BN and BED groups rated their responses significantly higher than the OW and NW groups.

The VAS "I'm fat, I must lose weight" interaction is presented in Figure 36.

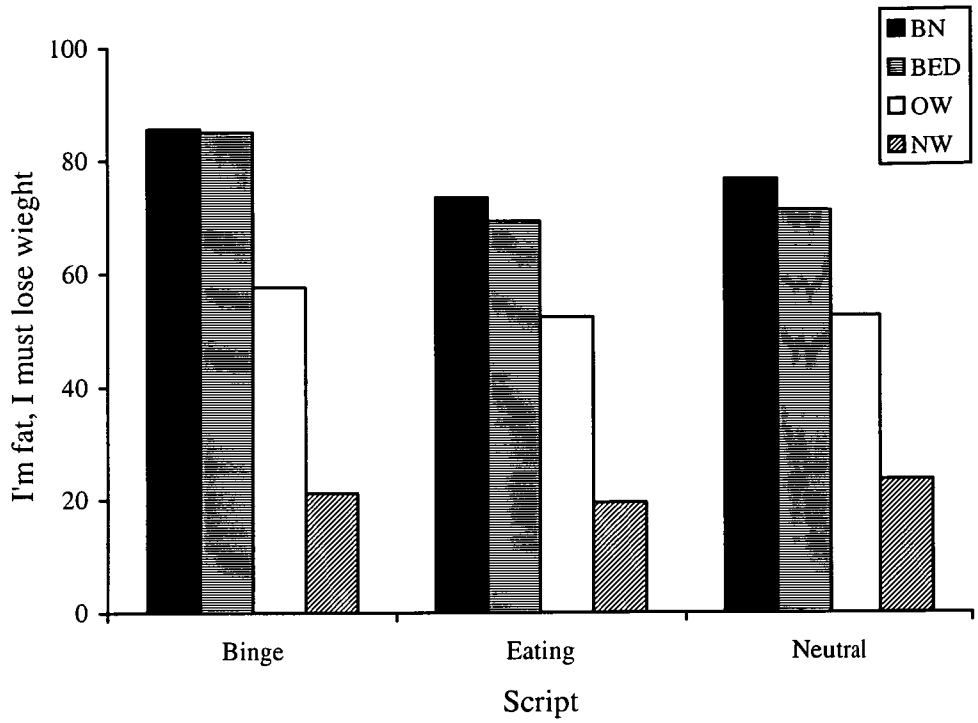

Figure 36. The mean ratings for the VAS "I'm fat, I must lose weight" for each script for each of the four groups.

The normal weight group rated their responses significantly lower than the BN and BED groups on all three scripts. Further, the BN group rated the binge script significantly higher than the normal eating script, and the BED group rated the binge script significantly higher than the normal eating and neutral scripts.

Figure 37 shows the interaction for the VAS "I do not like the way I look".

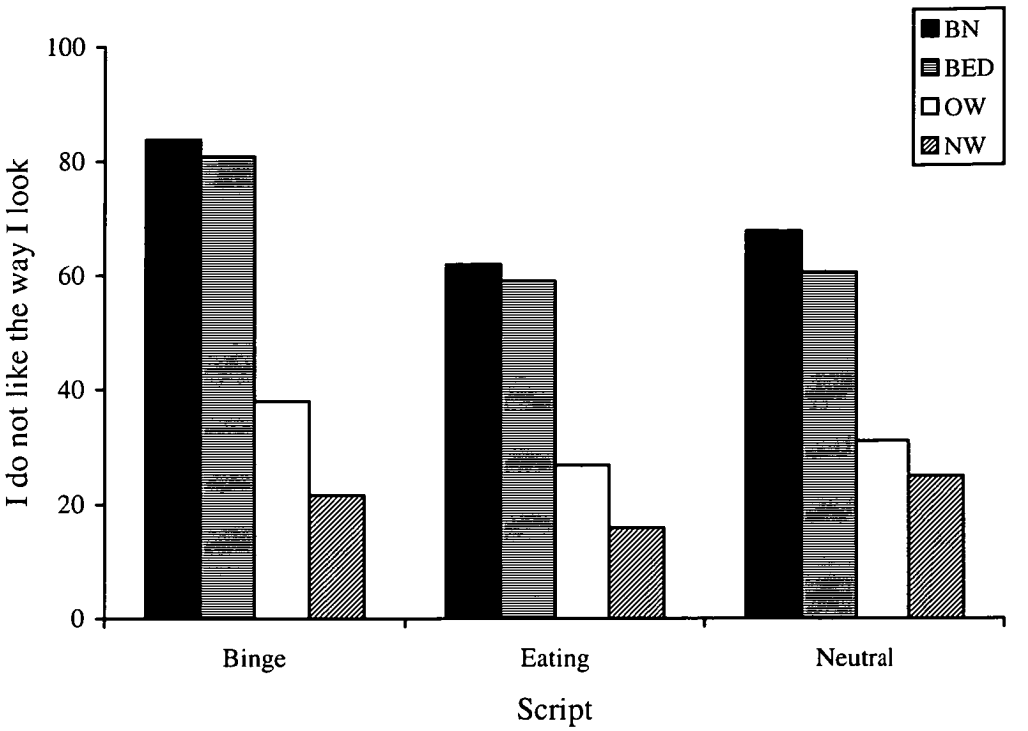

Figure 37. The mean rating for the VAS "I do not like the way I look" for each script for each of the four groups.

The BN group rated significantly higher than the OW and NW groups, and the BED group rated higher than the NW group on their responses for the binge eating script. For the BN and BED groups, responses were significantly higher on the binge script than the normal eating and neutral scripts. Further, the binge script was rated higher than the normal eating script for the OW group.

For the VAS "things are going well with my eating", the interaction is presented in Figure 38.

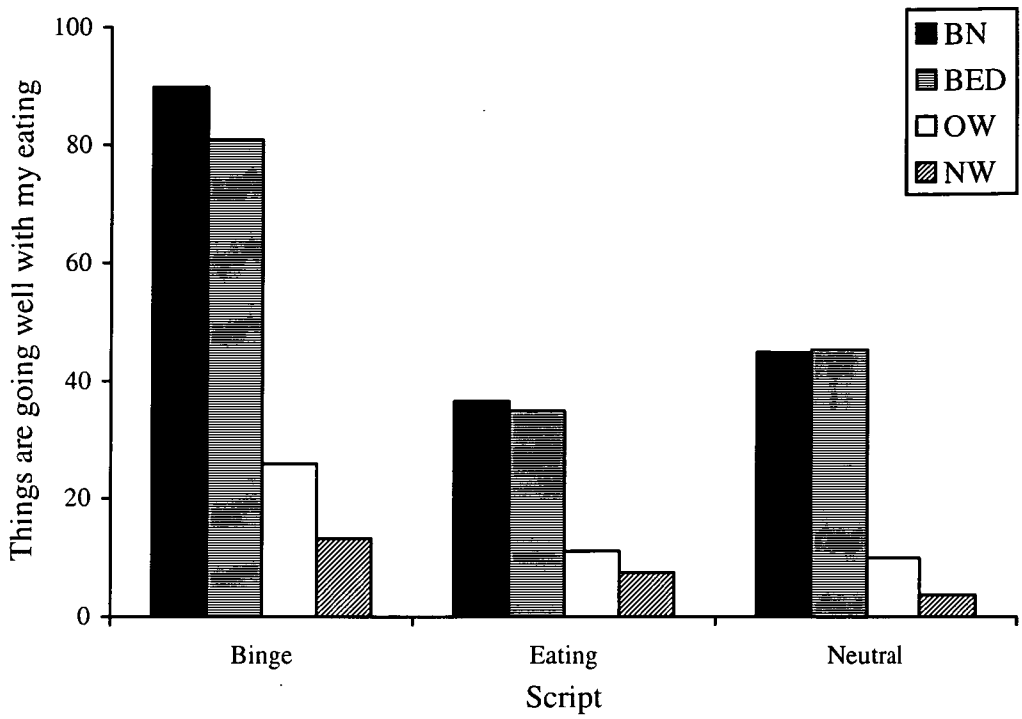

Figure 38. The mean ratings for the VAS "things are going well with my eating" for the four groups on each of the three scripts.

For the binge eating script, the BN and BED groups rated significantly higher than the OW and NW groups. The binge script was rated significantly higher than the normal eating and neutral scripts for the BN, BED, and OW groups.

The interaction for the VAS "I have no self-control" is presented in Figure 39.

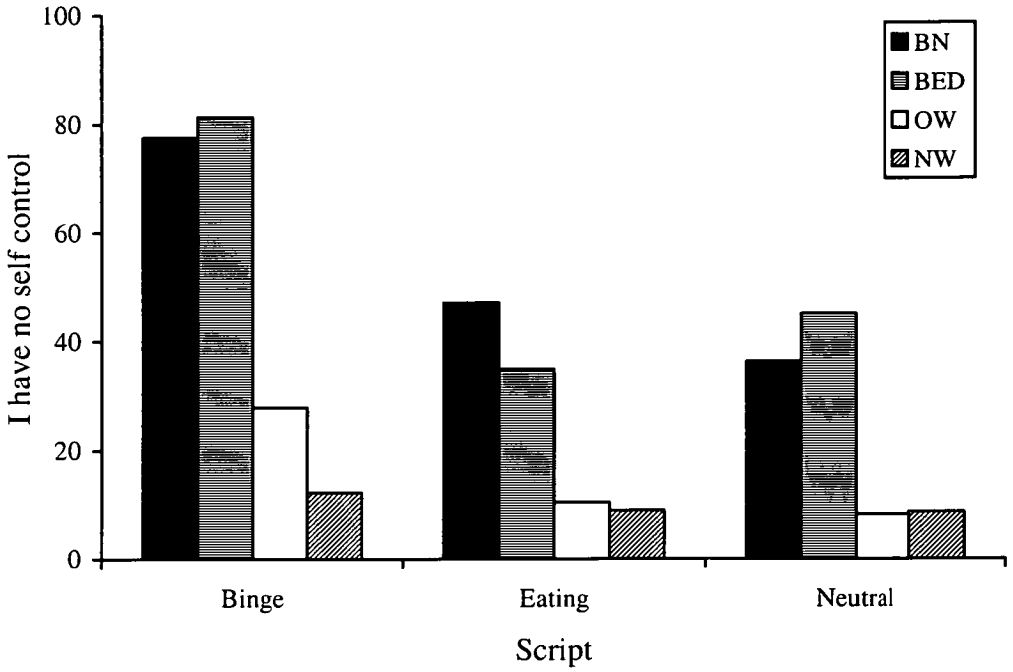

Figure 39. The mean ratings for the VAS "I have no self control" for the four groups on each of the three scripts.

For the binge eating script, the BN and BED groups rated significantly higher than the OW and NW groups. The BN group rated significantly higher than the OW and NW groups for the normal eating script, and the BED group rated significantly higher than the OW and NW groups for the neutral script. The binge script was rated significantly higher than the normal eating and neutral scripts for the BN, BED, and OW groups.

Script main effect. There was a significant main effect for script for the VAS, "I want everyone to like me", $F(2,112) = 6.18$, $MSE = 1700.35$, $p = 0.003$. The means, standard deviations and post hoc results can be seen in Table 42.

Table 42.

Means and standard deviations for each script, binge eating, normal eating and neutral, on the VAS, "I want everyone to like me".

VAS	Script	*M*	*SD*
I want everyone to like me	Binge	56.90	31.57
	Eating	52.50	30.87
	Neutral	52.38	31.01

Post hoc analysis shows that the binge eating related script had significantly higher levels of responding than the normal eating and neutral scripts.

11.4 DISCUSSION

The aim of this study was to examine the cognitive component relating to binge eating and overeating. The general level of cognitive dysfunction of the groups was examined, as well as changes in specific cognitions across a binge eating episode.

Very few differences existed between groups on the measures of general cognitive dysfunction. There were slight elevations for the BN group for need for approval and fear of the unknown, and for the BED group for the belief 'it is horrible when things are not the way I would like them to be'. The lack of real differentiation between groups on general measures of cognitive dysfunction has been reported in other studies (Dritschel et al., 1991; Kuehnel & Wadden, 1994; Strauss & Ryan, 1988).

However, it is interesting to note that the BN group more strongly endorsed the need for approval. This finding is consistent with a study by Schenker (1998) that reported that individuals with BN had a greater need for social approval than non-eating disorder controls and individuals who engaged in dieting. Furthermore, this finding is also supported by the results of Chapter 10, that found that negative emotional response was stronger for the BN group in the situations of eating in front of family in friends and eating in pubic, in comparison to the other groups. The greater ratings of embarrassment may be explained by the findings of Higuchi and Fukada (2002), who reported that embarrassment was associated with apprehension regarding social evaluation. If the BN group had a stronger need for social approval, it would follow that they would feel a greater level of apprehension regarding social evaluation and, therefore, report elevated levels of embarrassment.

The cognitive response to imagery was then considered. Different patterns of response at the stages of the scripts were noted for groups. Each group was considered separately. For the BN group, the binge eating script was associated with a stronger endorsement of the cognitions, "I should not have eaten that", "I have already eaten too much, so I may as well eat more", and "I am disappointed with myself" at almost all stages. This is not surprising given the dysfunctional nature of binge eating in this group.

Of more interest is the fact that at the incident stage for the cognition "I have already eaten too much, so I may as well eat more", and at the resolution stage of all three cognitions, their reaction to normal eating was stronger than the neutral event and that the level of endorsement of these cognitions placed the ratings in the negative range. Elevation in the intensity of cognitive distortion

has been found to be more distinct for a binge meal in comparison to a normal meal (e.g., Davis et al., 1988; Lingswiler et al., 1989; Powell & Thelen, 1996). However, this study provides evidence to suggest that distorted cognitions also increase, but to a lesser extent, in association with normal eating. This is further evidence that the relationship with food for individuals with BN is problematic.

When consecutive stage changes were considered, different patterns for the three cognitions were evident for the BN group. In the case of the VAS "I should not have eaten that", there was an increase in the endorsement of the cognition over the first three stages of binge imagery and the level of endorsement was maintained over the resolution and consequence stages. This cognition, in combination with other factors could easily be a contributor to the subsequent purging behaviour. The increased endorsement over the first three stages indicates an anticipatory response, as eating does not occur until the incident stage. Anticipatory responses have been reported in other psychiatric disorders. For example, individuals with social phobia have been found to respond to an anticipated situation with intense irrational fear (Coles & Heimberg, 2000; Judd, 1994). It may be that individuals with BN have an anticipatory response to eating, particularly binge eating.

In addition to an anticipation response, Phelan (1987) reported that individuals with BN have an unrealistic expectation of what may happen if they eat food that they consider to be 'forbidden'. Binge episodes in individuals with BN have been found to mainly consist of these forbidden foods (e.g., Gendall et al., 1997; Van der Ster Wallin et al., 1994). These beliefs about food in general may also contribute to the elevation in cognitive responding prior to engaging in eating behaviour.

In contrast, despite the same increased endorsement of the cognition "I have already eaten too much, so I may as well eat more" over the first three stages of the binge imagery, there was a subsequent decrease from the resolution to the consequence stages. Clearly, this is related to the cessation of the binge episode with such a cognition triggering the end of the need to consume food.

Disappointment in self was elevated across all of the stages to a markedly distressed level. Interestingly, strong endorsement of this cognition occurred prior to the binge and may be explained in terms of a precipitating factor. Hsu (1990) reported that individuals with BN make certain statements to themselves in the early part of binge eating, which may be involved in perpetuating the behaviour. Therefore, from the literature, it appears that individuals are aware that they are going to engage in binge eating behaviour. The elevated ratings of the cognition "I am disappointed in myself" at the setting the scene and approach stages is consistent with this.

The literature has indicated that prior to engaging in binge eating, individuals with BN have elevated levels of distorted cognitions (e.g., Lingswiler et al., 1989; Powell & Thelen, 1996). This was supported by the results of this study. Powell and Thelen (1996) theorised that these elevated levels of cognitive distortion, along with negative affect, led to the break in dietary restraint and binge eating.

The act of binge eating did not alter the endorsement of the cognition "I am disappointed in myself". It could be speculated that either the rating of this cognition would reduce after purging, as the episode for the BN group would be brought to a close, or that disappointment with self is a pervasive state that influences all aspects of the individual's existence. There is evidence to refute

the latter explanation. Although there was an increase in disappointment in self from the incident to resolution stage of the normal eating script, the overall level of endorsement of this cognition to normal eating and neutral imagery was much lower than to binge eating. Therefore, it is more likely that the level of endorsement of this statement would remain high until after purging behaviour. In support of this, previous studies have indicated that after a binge episode, there is an increase in the intensity of cognitions regarding food and weight (e.g., Powell & Thelen, 1996). This study indicated that there is also a negative increase in the intensity of cognitions regarding self.

Substantial increases of endorsement of "I should not have eaten that", and "I have already eaten too much, so I may as well eat more" occurred in response to normal eating imagery from the approach stage to the incident stage. The level of response was in the moderately negative range. These results further support the notion that the relationship with food for the BN group is problematic.

The BED group demonstrated a pattern of response that was different to the BN group. In response to the cognition "I should not have eaten that", elevated ratings for the binge script relative to the normal eating and neutral scripts was not noted until the incident stage, but remained significantly higher thereafter. This is not surprising, as consumption of food did not actually occur until the incident stage.

In relation to the cognition that "I have already eaten too much, so I may as well eat more", binge eating elicited a stronger endorsement than normal eating at every stage, and also than neutral imagery at the incident and resolution stages for the BED group. It is interesting that the interpretation being made by

the participants is that they had eaten too much even before they began binge eating. For individuals with BED, Arnow et al. (1992) found that prior to the binge cognitions typically involved the intention to overeat. Therefore, the elevated response to this cognition may be an anticipatory response, possibly giving the individual permission to engage in binge eating. In addition to this, the literature suggests that individuals with BED have rigid and perfectionistic attitudes about dieting (e.g., Gormally et al., 1982; Marcus et al., 1985, 1988). These rigid attitudes would be consistent with an increase in cognitions prior to binge eating, given the fact that individuals with BED are aware that they are going to engage in binge eating.

Disappointment in self was elevated across all stages of the binge script. This is similar to the BN group, indicating that individuals with BED know that they are going to engage in the binge eating behaviour. The results for the binge eating script were significantly higher than the normal eating and neutral imagery. The elevation in response to normal eating found at the resolution stage for the BN group was not evident for the BED group. This suggests that the relationship with food for the BED group is not as pervasively problematic as for the BN group.

Elevations were evident in relation to the binge episode from the approach stage to the incident stage for the cognitions "I should not have eaten that" and "I am disappointed in myself". This is consistent with the finding of Cooper et al. (1998), who reported that cognitions intensified during the binge. It should be noted that in relation to the binge eating script, the overall level of responding was negative.

For the OW group, the consistent differences were between the overeating and other scripts at the resolution and consequence stages, with the cognitions being more strongly endorsed for the overeating script. This indicates that the OW group do exhibit higher levels of cognitive distortions in relation to overeating. However, the elevated negative cognitions were only evident for the stages at the time of eating and following this. There was no evidence of the cognitive distortion prior to overeating in the OW group that was evident for the BN and BED groups. This indicates that individuals who are OW respond negatively when they overeat, but this does not appear to be dysfunctional.

In comparison to the eating disordered groups, the extent of dysfunction for the OW group was at a much lower level. This is consistent with the literature, which reported that obese BED individuals have more negative self-evaluations of greater intensity than obese non-BED individuals (Nauta, Hospers, Jansen et al., 2000). For the OW group, elevations at the incident stage in response to overeating were noted for the cognitions "I should not have eaten that" and "I am disappointed in myself", although the latter cognition in response to overeating could not be distinguished from the normal eating script. There were no consecutive stage changes across the scripts for the OW group.

Very few between script differences were noted for the NW group. Not surprisingly, the cognition "I should not have eaten that" was endorsed more strongly in relation to overeating than neutral imagery at the resolution and consequence stages. The general discomfort associated with overeating would be sufficient to increase the endorsement of this cognition at these stages. The level of endorsement was the lowest for the NW group in comparison to the other groups. No consecutive stage changes across scripts were noted.

The pattern of response between scripts at each stage were the same for each group for a number of cognitions. In general, the binge script elicited stronger levels of endorsement for the cognitions "I wish I could eat and not gain weight", "I am pleased with the way things are going", "I'm fat, I must lose weight", "I do not like the way I look", "things are going well with my eating", and "I have no self-control". It was interesting to note that the overall strength of endorsement was greatest, irrespective of script, for "I wish I could eat and not gain weight", "I'm fat I must lose weight", and "I do not like the way I look". This suggests a more pervasive influence of these cognitions over and above that expected when associated with binge eating or overeating. A number of studies have reported that women have high levels of body dissatisfaction (e.g., Hoyt & Kogan, 2001; Lokken, Ferraro, Kirchner, & Bowling, 2003). Thompson and colleagues (1987) found that women in general had a desire to be lighter than the weight suggested for their height. In support of this, Garfinkel et al. (1992) reported that body dissatisfaction has been associated with the eating symptomatology of BN, but has also been found to be common in non-eating disordered women.

When considering consecutive across stage changes, there was a general pattern of increase to a peak point either in the incident or resolution stage. During binge eating, Cooper et al. (1998) reported that automatic thoughts were intensified. This is consistent with the increase at either the incident or resolution stages.

Whereas the pattern of response between the scripts at each stage was similar between the groups on a number of cognitions, group differences were noted on some of the cognitions measured. The BN and BED groups have the

strongest endorsement on a number of cognitions associated with bingeing including "I feel good about my appearance", "food is my only comfort", "I am pleased with the way things are going", "I am fat I must lose weight", "I do not like the way I look", "things are going well with my eating" and "I have no self-control". All ratings placed the BN and BED groups in the negative range. These cognitions are consistent with the eating symptomatology that was reported to be associated with BN and BED in Chapter 8. The BN and BED groups had significantly higher levels of Eating, Weight and Shape Concern than the OW and NW groups as measured by the EDE (Fairburn & Cooper, 1993). These elevated levels of concern regarding food and body for individuals with BN and BED have also been consistently reported in the literature (e.g., Butow et al., 1993; Kuehnel & Wadden, 1994; Powell & Thelen, 1996; Spitzer et al., 1993; Striegel-Moore et al., 2001; Wilfley, Schwartz et al., 2000).

Of interest was the fact that the BN group also endorsed the cognitions "food is my only comfort", "I'm fat, I must lose weight" and "I have no self-control" in response to normal eating imagery. Powell and Thelen (1986) reported negative cognitions before a normal meal, but indicated that negative cognitions were more prominent prior to a binge meal. The BED group also strongly endorsed the cognition "I'm fat, I must lose weight" in response to normal eating. However, the most problematic results were in relation to the negative application of these cognitions to neutral imagery. The BN and BED groups both reported a pervasive influence of the cognitions "I'm fat, I must lose weight" and "things are going well with my eating". Distinguishing the groups was that the BED group reported loss of control in response to neutral imagery, and BN endorsed the cognition that food is their only comfort.

Generally speaking, bingeing and overeating resulted in higher ratings of negative cognitions for the BN, BED and OW groups, although, the respective level was higher for the BN and BED groups. This result is consistent with the findings from Chapter 8, examining the level of eating disorder symptomatology for these groups. The BN and BED groups had higher levels of eating disorder symptomatology and, therefore, it would be expected that these groups would have more dysfunctional cognitions specific to food and body.

For the cognition "I want everyone to like me", a main effect was found for script. Binge eating or overeating lead to this cognition being most strongly endorsed for all groups. When examination was made of the general cognitive distortion related to the need for approval, it was the BN group who showed the strongest endorsement. However, when the process of eating was examined, all groups experienced the influence of this cognitive distortion.

It was hypothesised that the level of general cognitive distortion would be elevated for the BN group in comparison to other groups, and elevated for the BED group in comparison to the OW and NW groups. The results of this study indicated that the BN and BED groups were more elevated than the OW group on some of the general cognitive distortions. However, there were minimal differences between groups.

For specific cognitive distortions, it was hypothesised that the BN and BED group would endorse these more strongly in relation to the binge eating script, compared to the normal eating and neutral scripts. This hypothesis was supported for the majority of cognitions. The two cognitions where the BN and BED groups were not significantly different to the OW and NW groups were the cognitions "I want everyone to like me" and "I wish I could eat and not gain

weight". The cognition "I want everyone to like me" is a general cognitive distortion, unrelated to food and body. Therefore, given the limited differences in general cognitive distortions it is not surprising that there was no difference on this cognition.

Given that cognitive distortions are thought to maintain the binge eating behaviour, it was hypothesised that the intensity of the specific cognitive distortions across the binge eating episode will vary for the BN and BED groups. A greater variation in the intensity was observed for the binge eating scripts for these groups on the VASs "I should not have eaten that" and "I have already eaten too much, so I may as well eat more", and for the BED group the VAS "I am disappointed with myself". This variation in intensity may be involved in the perpetuation of the binge eating episode.

In summary, the BN and BED groups have more salient negative cognitions in response to food and body, and the intensity of the response varies across a binge eating episode. The BED group is more similar to the BN group than the OW group in terms of cognitions. The BN group demonstrated a more elevated anticipatory response to binge eating, and a greater intensity of negative cognitions in response to normal eating than the BED group. This provides further evidence to suggest that BN is a more severe form of eating disorder than BED. The cognitive responses of the BED group to imagery suggest that individuals in this group had a dysfunctional response to binge eating, more indicative of an eating disorder.

CHAPTER 12

SUMMARY AND CONCLUSIONS

12.1 SUMMARY OF RESULTS

BED was proposed as a new diagnostic category for eating disorders in the DSM-IV (APA, 1994). Further research was required to determine the utility of this diagnostic category. For BED to be considered a diagnostic category, it would need to be significantly different from other eating disorders, and have a greater severity of symptoms than an eating disturbance. Given that BED is a relatively new diagnostic category, the majority of research examining eating disorders has been focused on BN and AN. Researchers have made comparisons between BN and AN (e.g., Cooper et al., 1989), BN and restrained eating (e.g., Wilson & Smith, 1989), and BN and non-eating disordered controls (e.g., Cooper et al., 1989). In more recent times, BN has been compared to BED (e.g., Striegel-Moore et al., 2001). Individuals with BED have also been compared to obese individuals who do not engage in binge eating (e.g. Wilfley, Schwartz et al., 2000).

The present investigation made comparisons between individuals with BN, BED, non-binge eating overweight individuals, and normal weight non-eating disordered controls. The BN and BED groups were based on DSM-IV diagnostic criteria (APA, 1994). The BN group met all the diagnostic criteria with the exception of the frequency criteria in some cases. The study allowed for clarification of the issue regarding whether BED was more similar to an eating disorder, that is, more similar to BN, or an eating disturbance, that is, more similar to overweight individuals. It also provided an indication of whether BED was distinct from BN.

Previous studies have illustrated that demographically, individuals with BED differ from those with BN. Individuals with BED tend to be older and

heavier than those with BN (e.g., Mussell et al., 1995; Spurrell et al., 1997). The results from the first study supported this notion. No differences in age and weight were found between the BED and OW groups. In terms of dieting and bingeing behaviour, there were no differences between age of onset of these behaviours for both the BED and BN groups. The literature supported this finding, but has also reported a greater variation in age for the onset of BED in comparison to BN (e.g., Spurrell et al., 1997). A greater standard deviation for the BED group in the current study supported the concept of greater variance in age of onset. Therefore, in terms of demographics and onset of binge eating behaviour, there appeared to be distinct differences between individuals with BED and BN. However, demographically, the BED and OW groups were similar.

The DSM-IV (APA, 1994) defines the binge eating behaviour identically for both BN and BED. In addition, a number of behavioural responses to binge eating are included for individuals to meet the diagnostic criteria for BED. This study indicated that these additional behaviours are just as relevant for individuals with BN as they are for individuals with BED. However, given that the behaviour of binge eating is the same for both disorders, this result is not surprising. For the disorders to be distinct, they would need to differ on other aspects.

Assessment instruments for measuring eating symptomatology have been based on features specific to BN and AN. Individuals with BN have been reported to have high levels of dietary restraint (e.g., Polivy & Herman, 1985; Ruderman & Besbeas, 1992), and elevated concerns regarding food and body (e.g., Kuehnel & Wadden, 1994; Wilfley, Schwartz et al., 2000). The EDE, in

comparison to the EDI, has been reported to be able to reliably discriminate between different eating disorders, and between eating disorders and eating disturbances (e.g., Fairburn & Beglin, 1994; Wilson & Smith, 1989). In this study, the EDE provided evidence of differences between the BED and BN groups, and also between the BED and OW groups. The EDI was not able to distinguish as clearly.

The results from the EDE indicated that individuals with BN had significantly higher levels of Restraint and Weight Concern than those with BED. The difference in level of dietary restraint has been consistently reported in the literature (e.g., Marcus et al., 1992; Laessle et al., 1989; Polivy & Herman, 1985; Ruderman & Besbeas, 1992). For individuals who engage in binge eating, it appears that dietary restraint is specific to those with BN, and not as relevant for those with BED. There was no significant difference in dietary restraint between individuals with BED and non-BED overweight individuals.

The increased level of Weight Concern found in the BN group is of interest, given that the BED group weighed significantly more. This indicated that individuals with BN have a greater degree of psychopathology than those with BED and, therefore, that BN is a more serious form of eating disorder. There is evidence in the research to indicate that individuals with BN and BED have similar levels of concern regarding eating and body (e.g., Striegel-Moore et al., 2001; Wilfley, Schwartz et al., 2000). The results of Study 1 supported this notion, with no significant differences in Eating and Shape Concern for the BN and BED groups.

The BED group had significantly higher Weight, Shape and Eating Concern than the OW group. The OW and NW groups only differed in terms of

Weight Concern, with the OW group having an elevated level of concern. Given the elevated levels of eating symptomatology for the BED group in comparison to the OW group, BED appears more similar to an eating disorder, rather than an eating disturbance.

Individuals with BN have been found to have elevated levels of general symptomatology compared to non-eating disordered control groups (e.g., Brewerton et al., 1995; Carroll et al., 1996; Crow et al., 1996; Garfinkel, Lin et al., 1995; Zaider et al., 2002). General cognitive distortion has also been reported to be more elevated for individuals with BN in comparison to individuals with BED (Crow et al., 1996; Prather & Williamson, 1988). The results from Study 1 showed no significant difference between the BN and BED groups in terms of general symptomatology measured by the SCL-90-R or BDI-II. However, the BN group demonstrated a level of general symptomatology that would be considered clinically significant (Derogatis, 1994), whereas the BED group did not. Furthermore, the BN group experienced depression in the moderate range, whereas the BED group was in the mild range. Clinical significance considerations indicated that the BN group had more severe general symptomatology and depression than the BED group.

Individuals with BED have been reported to have more elevated general symptomatology than obese non-eating disorders individuals, individuals with EDNOS, and non-eating disordered controls (e.g., Marcus et al., 1990; Mussell et al., 1996; Powers et al., 1999; Specker et al., 1994; Telch & Stice, 1998; Wilfley, Schwartz et al., 2000). The results from Study 1 were consistent with this, with the BED group experiencing elevated levels of general symptomatology and

depression compared to the NW and OW groups, as measured by the SCL-90-R and BDI-II.

In terms of general symptomatology, the results suggested that individuals with BED have less severe symptomatology than those with BN, but elevated in comparison to the OW group. This again supports the proposition that BED is more similar to an eating disorder, but less severe than BN.

The psychophysiological responses of individuals with BN and BED when engaging in eating have been examined in the literature. Subjective psychophysiological responses have been examined by a number of researchers (e.g., Abraham & Beumont, 1982; Arnow et al., 1992; Greeno et al., 2000; Hsu, 1990; Karhunen et al., 1997, 2000; Stickney et al., 1999).

Prior to engaging in binge eating, tension has been found to be the most strongly endorsed sensation for individuals with BN (e.g., Abraham & Beumont, 1992; Hsu, 1990). For individuals with BED hunger has been reported to be the strongest sensation (e.g., Arnow et al., 1992; Greeno et al., 2000; Karhunen et al., 1997), with no differences between obese BED and obese non-BED individuals being reported (e.g., Greeno et al., 2000; Karhunen et al., 2000).

During a binge, Hsu (1990) found that tension decreased from prior to a binge, but was still the most strongly endorsed sensation. Individuals with BED have reported pleasant sensations while engaging in binge eating (Arnow et al., 1992). After a binge, Hsu (1990) reported a further decrease in tension from during the binge. Individuals with BED have been found to report the sensation of fullness (Arnow et al., 1992).

The results from Study 2 found no change in the level of tension reported across a binge eating episode. For both the BN and BED groups, tension was

rated significantly higher than for the OW and NW groups for the binge eating related script, and the response to the binge eating script was rated as more tense than the normal eating and neutral scripts. This indicated that tension remained high throughout the binge eating episode and is consistent with the findings of Hsu (1990), who reported that tension is strongly endorsed across a binge eating episode.

The level of physical discomfort was found to change across the stages of the script. For all groups, discomfort increased from prior to the binge to during the binge, and again increased from during the binge to after the binge. The increase that occurred during the binge may have been an anticipatory response. Anticipatory responses have been reported in disorders such as social phobia (e.g., Coles & Heimberg, 2000; Judd, 1994). An intense elevation of fear to an anticipated situation has been observed in individuals with social phobia.

In terms of subjective psychophysiological responses to binge eating, there were no differences between the BN and BED groups, but the BED group was significantly different to the OW group. This indicated that BED is more similar to an eating disorder than an eating disturbance with regard to their subjective psychophysiological response to binge eating.

Objective psychophysiological changes have been assessed using a range of methodologies. Food exposure and test meals have been commonly utilised (e.g., Cattanach et al., 1988; Karhunen et al., 1997, 2000; Laberg et al., 1991; Leonard et al., 1998; Voegele & Florin, 1997; Williamson et al., 1988). Studies to date have shown contradictory findings. Increases in psychophysiological arousal have been reported (e.g., Neudeck et al., 2001; Voegele & Florin, 1997) as have decreases (e.g., Williamson et al., 1988). Furthermore, some studies

have reported no change (e.g., Buree et al., 1990; Karhunen et al., 1997; Laberg et al., 1991)

The results from Study 2 indicated that there was no evidence of increased arousal in the BN and BED groups in comparison to the OW and NW groups. There was evidence to suggest that the binge eating script had elevated levels of heart rate for all groups, suggesting an elevation in physiological distress to over eating or binge eating.

The emotional response to eating has been examined in the literature, and there is evidence to suggest that individuals with disordered eating have an elevated negative emotional response to eating in comparison to non-eating disordered individuals (Greeno et al., 2000; Johnson & Larson, 1982). The results from Study 3 supported these findings, with the BN and BED groups endorsing negative emotional responses more strongly than the OW and NW groups when examining eating related stimuli.

Eating in the privacy of one's home has been found to increase the risk that binge eating would occur (deZwaan et al., 1992; Engstroem & Norring, 2001; Schlundt et al., 1985). The results from Study 3 regarding eating alone indicated only low levels of negative emotional responding for the BN and BED groups. However, the questionnaire referred to eating, and not binge eating. The BN and BED groups were not distinguishable in their emotional responses to eating in this situation, but were more negative than the OW and NW groups.

Previous studies have reported that individuals with BN avoid eating in situations where their behaviour is under scrutiny (deZwaan et al., 1992; Engstroem & Norring, 2001). Consistent with this, individuals with BN were found to have elevated negative emotional responding in comparison to

individuals with BED to the situation of eating in front of family and friends. The BED group had greater negative responses compared to the OW and NW groups. However, for the situation of eating in public, the BN and BED groups had higher ratings of negative emotional responses than the OW and NW groups, but there was no difference between the BN and BED groups.

Embarrassment was endorsed strongly for the BN and BED groups for the situations eating in front of family and friends and eating in public. Higuchi and Fukada (2002) found that embarrassment is related to disruption of a social interaction, apprehension of social evaluation, inconsistency with self-image, and a loss of self-esteem. The high levels of embarrassment for the BN and BED groups may be related to these factors.

Research has indicated that females are more likely to eat in response to boredom than males (e.g., Abramson & Stinson, 1977; Wilson, 1986). Boredom has also been found to be one of the most intense antecedents to a binge in individuals who engage in binge eating (Stickney et al., 1999). In addition, individuals with BN symptoms were found to have an expectancy that engaging in eating would alleviate feelings of boredom (e.g., Hohlstein et al., 1998; Lacey et al., 1986; Simmons, 1998; Simmons et al., 2001). For the situation eating when feeling bored, the results indicated that individuals with BN and BED did not significantly differ on the emotional responses anxious, distressed, disgusted and sad. The BN group had significantly elevated responses for embarrassment and hunger. The increased level of hunger for the BN group may be due to a decreased ability for this group to accurately interpret hunger signals (e.g., Anderson et al., 1996; Hetherington & Rolls, 2001; Sunday & Halmi, 1996). The OW and NW groups demonstrated different patterns of response than the

BN and BED groups for the situation eating when feeling bored, with lower ratings of negative emotional response for the OW and NW groups.

For the situation eating when feeling upset, the BN and BED groups responded in a similar and strongly negative way. However, the BN group reported feeling significantly more hungry and embarrassed. The OW and NW groups had significantly lower levels of negative emotional responses than the BN and BED groups.

The situation eating when feeling tired had lower levels of psychological responding in general. The BN group had elevated responses for embarrassment and distress compared to the BED group. The higher levels of distress for the BN group may be related to less adequate coping strategies for this group (e.g., Freedy & Hobfoll, 1994; Molassiotis et al., 1997; Niemi & Vainiomaeki, 1999; Stoddard, 1995).

Individuals with BN have been reported to have elevated levels of eating symptomatology, and this was supported by Study 3. Individuals with BN endorsed negative emotions more strongly than all other groups for the situation eating when feeling happy. This indicated that individuals with BN generally respond negatively to eating in all situations.

Guilt has commonly been associated with women with eating disorders (e.g., Allen et al., 1998; Burney & Irwin, 2000; Frank, 1991; Sanftner & Crowther, 1998). The results from Study 3 supported this, with the BN and BED groups endorsing higher levels of guilt than the OW and NW groups. Differences in the pattern of emotional responding were evident between the BN and BED groups across the different eating situations. Furthermore, the BN group was more negative in some responses than the BED group.

The emotional response across a binge eating episode, normal eating episode and a neutral event was examined. In response to normal eating at the incident stage, the BN group reported more guilt than was reported in relation to the neutral imagery. This was not evident for other groups. This is consistent with the finding that eating disordered individuals demonstrate elevated levels of guilt in response to eating (e.g., Allen et al., 1998; Burney & Irwin, 2000; Frank, 1991; Sanftner & Crowther, 1998). The fact that this only occurred for the BN group and not the BED group indicated that BN is a more serious form of eating disorder.

Across the stages of the binge eating script for all groups, there was an increase in negative emotional state until the consequence stage, when the negative emotional state began to decrease. This decrease may be attributed to different reasons for each group, and may be related to other variables in addition to emotion, such as cognitions.

It has been demonstrated in the literature that immediately after binge eating there is an increase in negative emotions (e.g., Elmore & de Castro, 1990; Hsu, 1990; Kenardy et al., 1996; Lingswiler et al., 1989; Mitchell et al., 1999; Powell & Thelen, 1996). The results from Study 3 were consistent with this, with an increase in negative emotional state following the act of binge eating.

Group differences were found in Study 3, with the BN and BED groups demonstrating elevated negative emotional responses in comparison to the OW and NW groups for the binge eating script, and more fear for the normal eating script.

The results from Study 3 indicated that individuals with BN had more negative emotional responses to food in general in comparison to individuals

with BED. Individuals with BED had elevated negative emotional responses to food in comparison to the OW and NW groups, and responded to binge eating in a way that was more consistent with individuals with BN. The evidence suggests that BED is more similar to an eating disorder than an eating disturbance.

Study 4 examined the cognitive components of binge eating and normal eating. Measures of general cognitive dysfunction have demonstrated conflicting results, with some studies reporting a lack of differentiation between individuals with BN and other groups (e.g., Dritschel et al., 1991; Kuehnel & Wadden, 1994; Strauss & Ryan, 1988), whereas other researchers have found some differences (e.g., Schenker, 1998). The results from Study 4 indicated that the BN group more strongly endorsed the need for approval, and the BED group scored higher on the belief of demanding their own way.

Schenker (1998) reported that individuals with BN had a greater need for social approval than non-eating disorder controls and individuals who engaged in dieting. Furthermore, the elevated levels of negative emotional response for the situations eating in front of family and friends and eating in pubic for the BN group, as reported in Study 3, are consistent with a greater need for approval. Individuals with BN would feel a greater level of apprehension regarding social evaluation and, therefore, report elevated levels of negative emotional response in these situations.

Cognitions were examined across a binge eating episode, a normal meal and a neutral event. The results from Study 4 showed differences between groups across the scripts and stages. Individuals with BN have been found to have been shown to have elevated cognitive distortions to a binge meal in comparison to a normal meal (e.g., Davis et al., 1988; Lingswiler et al., 1989;

Powell & Thelen, 1996). The results from Study 4 supported this, but also found that a normal meal resulted in elevated cognitive distortions in comparison to a neutral event. This indicated that for individuals with BN, their relationship with food in general is problematic.

Distorted cognitions are thought to play a crucial role in the initiation and maintenance of the binge and purge behaviour in BN (Powell & Thelen, 1996; Thompson et al., 1987). The literature has indicated that prior to engaging in binge eating, individuals with BN have elevated levels of distorted cognitions (e.g., Lingswiler et al., 1989; Powell & Thelen, 1996). This was supported by the results of this study. Powell and Thelen (1996) theorised that these elevated levels of cognitive distortion, along with negative affect, lead to the break in dietary restraint and binge eating.

Different patterns for three cognitions were evident for the BN group. For the cognition "I should not have eaten that", an increase in the level of endorsement over the first three stages was found, and this elevation was maintained over the resolution and consequence stages. This cognition, in combination with other factors could easily be a contributor to the subsequent purging behaviour.

In contrast, despite the same increased endorsement of the cognition "I have already eaten too much, so I may as well eat more" over the first three stages of the binge imagery, there was a subsequent decrease from the resolution to the consequence stages. Clearly, this is related to the cessation of the binge episode with such a cognition triggering the end of the need to consume food.

Hsu (1990) reported that individuals with BN make certain statements to themselves in the early part of binge eating, which may be involved in

perpetuating the behaviour. Disappointment in self was elevated across all of the stages to a markedly distressed level, and may be explained in terms of a precipitating factor. Furthermore, it could be speculated that the rating of this cognition would reduce after purging, as the episode for the BN group would be brought to a close. In support of this, previous studies have indicated that after a binge episode, there is an increase in the intensity of cognitions regarding food and weight (e.g., Powell & Thelen, 1996).

The BED group demonstrated a pattern of response that was different to the BN group. In response to the cognition "I should not have eaten that", elevated ratings for the binge script relative to the normal eating and neutral scripts was not noted until the incident stage, but remained significantly higher thereafter. This is not surprising, as consumption of food did not actually occur until the incident stage.

Arnow et al. (1992) found that for individuals with BED, prior to the binge cognitions typically involved the intention to overeat. In relation to the cognition that "I have already eaten too much, so I may as well eat more", binge eating elicited a stronger endorsement than normal eating at every stage for the BED group. The interpretation being made by the participants was that they had eaten too much even before they began binge eating. Therefore, the elevated response to this cognition may have been an anticipatory response, possibly giving the individual permission to engage in binge eating. An alternative explanation may be that individuals with BED have consumed food prior to engaging in binge eating. A combination of consumption of food and emotional state may have triggered this cognition, resulting in the binge eating behaviour.

Disappointment in self was elevated across all stages of the binge script. This was similar to the BN group, indicating that individuals with BED knew that they were going to engage in the binge eating behaviour.

Cooper et al. (1998) reported that cognitions intensified during the binge. The results of Study 4 support this, with elevations evident in relation to the binge episode from the approach stage to the incident stage for the cognitions "I should not have eaten that" and "I am disappointed in myself".

For the OW group, the consistent differences were between the overeating and other scripts at the resolution and consequence stages, with the cognitions being more strongly endorsed for the overeating script. The elevated negative cognitions were only evident for the stages at the time of eating and following this. There was no evidence of the cognitive distortion prior to overeating in the OW group that was apparent for the BN and BED groups. This indicates that individuals who are OW respond negatively when they overeat, but this does not appear to be dysfunctional.

In comparison to the eating disordered groups, the extent of dysfunction for the OW group was at a much lower level. This is consistent with the literature, which has reported that obese BED individuals have more negative self-evaluations of greater intensity than obese non-BED individuals (Nauta, Hospers, Jansen et al., 2000).

Very few between script differences were noted for the NW group. The level of endorsement was the lowest for the NW group in comparison to the other groups. No consecutive stage changes across scripts were noted.

From Study 4, there was evidence to suggest that for individuals with BN and BED, different cognitions were endorsed more or less strongly at different

stages of the binge. The change in strength of cognition related to the initiation and cessation of the binge behaviour. For the BN group, cognitive distortion was also related to normal eating, as well as binge eating. This indicated a more dysfunctional relationship with eating for this group. The OW group was more similar to the NW group in terms of cognitive distortions.

Negative cognitions relating to an individual's body have been found to occur in both women with eating disorders and non-eating disordered controls (e.g., Hoyt & Kogan, 2001; Lokken et al., 2003; Thompson et al., 1987). Study 4 reported that across scripts the binge eating related script was generally rated higher than the normal eating and neutral scripts for all groups for VASs relating to weight and appearance. Elevated levels of these cognitions are not surprising given that women, independent of eating disorders, have been found to have elevated levels of cognitive distortion regarding their body (e.g., Lokken et al., 2003)..

Cooper et al. (1998) found that automatic thoughts intensified during binge eating. Consistent with this, the results from Study 4 indicated that the level of cognitive distortion peaked at the incident or resolution stages.

Individuals with BN and BED have been found to have elevated levels of eating disorder symptomatology in comparison to non-eating disordered individuals (e.g., Butow et al., 1993; Kuehnel & Wadden, 1994; Spitzer, Yanovski et al., 1993; Wilfley, Schwartz et al., 2000). Compatible with elevated symptomatology, the BN and BED groups showed significantly greater endorsement of cognitions relating to food and body in comparison to the OW and NW groups.

In terms of cognitions in relation to eating, individuals with BED were more similar to individuals with BN than OW and NW individuals. This again provided evidence to suggest that BED is more like an eating disorder than an eating disturbance.

Results of the present investigation have provided information regarding the utility of BED as a diagnostic entity. Differences between BED and BN and BED and OW groups have been highlighted, and have provided an indication of whether BED is more similar to an eating disorder or disturbance. Furthermore, the study has provided information regarding changes in psychophysiological, emotional and cognitive responses across a binge eating episode. This information allows for a greater understanding of the process of binge eating and, therefore, assists in providing effective therapeutic treatment for individuals who engage in binge eating.

12.2 CONCLUSIONS

The results from this study provided support for the proposition that BED is more consistent with an eating disorder rather than an eating disturbance. Eating symptomatology indicated that individuals with BED had elevated responses consistent with an eating disorder, however, BED appears to be a less severe eating disorder than BN.

There is evidence that BED is a distinct eating disorder, with demographic differences between BED and BN. These differences are consistent with previous findings (e.g., Spitzer et al., 1992, 1993). Furthermore, dietary restraint appears to be specific to individuals with BN and not associated to the same degree to individuals with BED.

The study indicated that overweight non-eating disordered individuals are characterised by little eating or other disturbance, and this was consistent with previous findings (e.g., Molinari et al., 1997; Wilfley, Schwartz et al., 2000; Zimmerman & Coryell, 1989).

There was considerable overlap between the binge eating behaviour in both BED and BN, indicating that there should be some overlap in the form of treatment. Effective treatment in the management of BN has included cognitive behavioural therapy (Agras, Schneider, Arnow, Raeburn, & Telch, 1989), pharmacological treatment (Mitchell et al., 1990) and interpersonal therapy (Fairburn et al., 1995).

However, there are some important differences between BN and BED that would need to be considered in terms of therapy. By definition, individuals with BED do not have inappropriate compensatory behaviours (APA, 1994). Individuals with BED tend to be overweight (e.g., Brody et al., 1994; Pacheco, 1999; Spitzer et al., 1992) and, given the medical implications of this, weight loss would need to be an important outcome of therapy.

Dietary restraint has not associated with BED (e.g., Spurrell et al., 1997) whereas restraint has been postulated as a key factor in the binge-purge cycle for BN (e.g., Fairburn, Marcus, & Wilson, 1993). Traditional methods of weight reduction in overweight populations incorporate the teaching of dietary restraint (e.g., Noel & Pugh, 2002). Given that dietary restraint is one of the main differences between individuals with BN and individuals with BED, and that the two groups share a number of common factors, the introduction of further dietary restraint for individuals with BED to reduce body weight may be counterproductive. The results from Study 1 indicated that individuals with BED

have significantly higher levels of dietary restraint than normal weight individuals. Therefore, it does not appear logical to encourage an increase in dietary restraint, as this may result in individuals with BED becoming more similar to individuals with BN. As BN is considered to be a more serious form of eating disorder than BED, it would be contradictory if a result of treatment for individuals with BED was that they became more similar to individuals with BN.

A recent proposition for the management of BED (Stunkard & Allison, 2003) recommended that treatment focuses on the amelioration of concomitant psychopathology and a behavioural weight loss program. Behavioural weight loss programs have been demonstrated to reduce binge eating frequency and have resulted in weight loss (e.g., Marcus, Wing, & Fairburn, 1995). These treatments do not consider the process of binge eating, and the results from the current study indicated that it is not only important to take into account reactions to eating in general, but also responses to binge eating.

From the current study, it is evident that the emotional responses and cognitions are clearly impacting on the binge eating process, and may play a fundamental role in the initiation and maintenance of this behaviour. Behaviour change in relation to weight control, without addressing the underlying mechanisms that drive binge eating leaves the individual vulnerable to reactivation of binge eating in response to internal or external stressors. Given that BED is a relatively new diagnostic category, studies examining treatment outcomes in the long term are largely absent from the literature (Stunkard & Allison, 2003). Relapse rates, when binge eating processes are not considered, are unknown. Indeed, it has been suggested that targeting binge eating resulting in the cessation of the behaviour, leads to weight loss as a consequence in some

cases (e.g., Agras et al., 1994; Smith, Marcus, & Kaye, 1992; Wilfley et al., 2002).

Furthermore, the rejection of cognitive behavioural therapy in favour of a behavioural weight loss program and the management of concomitant psychopathology discounts the apparent influence of distorted cognitions that occur at the time of binge eating. Clearly, dysfunctional thoughts that exacerbate binge eating behaviour would need to be addressed for the long term management of BED. Indeed, cognitive behavioural therapy has been reported to produce therapeutic gains in the management of BED (e.g., Wilfley et al., 2002). The current examination of the process of binge eating has identified that cognitive distortion during binge eating would need to be addressed for long term recovery. In fact, cognitive behavioural therapy has been proven to be superior to behavioural weight loss programs in maintaining therapeutic improvement over time (Nauta, Hospers, & Jansen, 2001).

Although behavioural weight loss programs have been shown to decrease weight in the short term, one of the recognised problems with these programs is sustaining the lower weight after the cessation of the intervention (e.g., Kaldau et al., 1982). The question has been raised as to what the effect would be on binge eating behaviour and associated symptomatology if weight were to return to pre-intervention levels (Wilfley et al., 2002). The results of the current study would indicate that failure to address process related factors would increase the likelihood that binge eating would be reactivated.

It has been recognised that in many cases there is an anomalous finding that management of binge eating does not result in a reduction in weight (see Dingemans et al., 2002). From the current study, it is evident that individuals

with BED have a problematic response to eating in general that is not as great as that experienced by individuals with BN, but is clearly greater than that of overweight or normal weight non-eating disordered individuals. Therefore, failure to address this general maladaptive response to eating would result in residual problems being evident, such as continued high weight, even when binge eating had been managed. Again, the process of eating is important to consider for adequate resolution of BED.

Behaviours and symptomatology associated with eating disorders provide an indication of the direction for treatment. However, a detailed examination the process of binge eating, including preceding and subsequent behaviours, allows for the identification of specific factors that can be targeted for treatment. The results from the current study indicated that the emotional response to binge eating in individuals with BED was negative. However, the cognitive responses for the BED group demonstrated that different cognitions are involved in the initiation, maintenance and cessation of binge eating. Treatment may be targeted at these different cognitions, specific to the stage that they occur. In addition, negative emotional response may also be incorporated in treatment. By aiming intervention at these areas and reducing the binge eating behaviour and managing the unhealthy relationship with food in general, the result may be weight loss, without the need to introduce dietary restraint.

The emotional and cognitive responses, although different for the BN and BED groups, would need to be integrated into treatment for both conditions. Again, these factors would need to be adjusted to be specific to the treatment group.

12.3 LIMITATIONS OF THE STUDY

The main limitation of this study was the limited sample size, particularly for the BN group. Furthermore, the participants in the BN group met all diagnostic criteria (APA, 1994), with the exception of the frequency criteria. Therefore, this group may not have been as disordered in terms of symptomatology. However, previous research examining the frequency criteria for BN have reported that the amount of calories consumed during a binge varies considerably. A binge has been reported to range between 100 and 6600 kcal (Gleaves et al., 1993). In support of this finding, the majority of studies that have examined the amount of food consumed during a binge have reported very large standard deviations (e.g., Fitzgibbon & Blackman, 2000; Gendall et al., 1997; Rosen et al., 1986). This has resulted in the questioning of the definition in the DSM-IV (APA, 1994) of binge eating consisting of a large amount of food (Wilson, 1992). Also, the eating symptomatology for the BN group in this study was consistent with that reported in previous studies (e.g., Wilfley, Schwartz et al., 2000). Therefore, the frequency criteria may not distinguish individuals with BN. Nevertheless, it is recognised that it would have been preferable to have a larger group that met the full diagnostic criteria for BN.

12.4 DIRECTIONS FOR FUTURE RESEARCH

There is evidence to suggest that BED is a form of eating disorder, albeit less severe than BN. The majority of research to date has focused on the behaviours associated with the condition (e.g., Walsh, 2003; Walsh & Boudreau, 2003), and has integrated previous information associated with BN and used this to provide information on BED (e.g., Crow et al., 2002; Fairburn, Cooper, Doll,

Norman, & O'Connor, 2000; Sullivan, 2001). The aim of much of this research has been to provide clear diagnostic criteria for the disorder, and to explore whether BED is distinct from BN. Although these are worthy pursuits, it is apparent that these approaches have limitations. BED is a distinct diagnostic entity and, therefore, there may be factors that are specific to the disorder, and are not a variation of those factors associated with BN.

The focus of research needs to be directed specifically at BED. Approaches related to the aetiology of BED tend to be extensions of those for BN. Measures of eating symptomatology have been developed based on AN and BN. A difficulty in using the same assessment tools is that individuals with BED have been found to have an older age of onset. Therefore, they do not have the maturity fears that are typical for individuals with AN and BN. Further, individuals with BED do not have the same degree of distortion regarding their body weight and shape. Therefore, it appears that the assessments for eating disorders are not relevant for BED.

In terms of management of individuals with BED, individuals with this disorder have a similar age of onset of the behaviours of dieting and binge eating, but a later age of onset for meeting the full diagnostic criteria. Therefore, there is an opportunity to intervene before the condition escalates, and as a result, would require more intensive therapy. Furthermore, research into more effective therapy for BED is required, perhaps targeting the process related areas suggested in this study.

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APPENDIX A

INFORMATION SHEET and CONSENT FORM

UNIVERSITY
OF TASMANIA

School of Psychology

The psychophysiological and psychological correlates of binge eating

The above project is being conducted by Dr Chris Williams, Dr Janet Haines and Mrs Shona Fullarton of the Department of Psychology at the University of Tasmania. The purpose of the project is to learn more about the differences between Bulimia Nervosa and Binge Eating Disorder. In particular, we are interested in the binge eating behaviour, and the thoughts and physiological responses that are involved. The aim is to distinguish differences between the two behaviours and to use this distinction in diagnosis of the disorders and in developing treatment models.

We are interested in comparing the reactions to overeating of people who suffer from Bulimia Nervosa with people who suffer from Binge Eating Disorder. A Comparison of these two groups will be made with people who have overeaten, but have never developed either of these two disorders. The participants in these three groups will be matched for sex, age and imagery ability

If you agree to participate, the nature of your overeating will be discussed with you. You also will be asked to complete some questionnaires about how you have been feeling recently and about your ability to picture things in your mind. You then will be interviewed about a particular overeating episode. This interview will be recorded on audio cassette. The information from the interview will be used to devise imagery scripts that will be used to guide you through the memory of the episode. You will be required to attend the laboratory and have electrodes and measurement instruments applied so that measures of heart rate and other cardiac responses, respiration and skin conductance can be taken. These measurements will be taken while you are guided through imagery of your stressful work event as well as a neutral event of your choosing.

If you agree to participate, please let us know if you are allergic to surgical tape so that we can take precautions against any reaction.

Private Bag 30 Hobart
Tasmania Australia 7001
Telephone (03) 6226 2237
Facsimile (03) 6226 2883

We wish to emphasise that the information you share with us will be treated in a confidential manner. All written information, computer data files and audio cassettes will be stored with a participation number rather than your name. The data will be secured in a locked cabinet.

Participation in this study is completely voluntary. If you are approached to participate and you do not wish to proceed you have the right to say no. In addition, if you decide to participate in the study but then change your mind and wish to withdraw, you may do so at any time without prejudice with regard to any treatment regimes, academic standing, or participation in future research projects.

If you wish to discuss the project before, during or after participation, please contact Dr Janet Haines on (03) 6226 7124. This project has been approved by the University Ethics Committee (Human Experimentation). If you have any concerns or complaints regarding the ethical nature of the project, you may contact the chair or Executive Officer of the University Ethics Committee (Human Experimentation). The contact numbers are as follows: Dr Margaret Otlowski, Chair, (03) 6226 7569; Ms Chris Hooper, Executive Officer, (03) 6226 2763. If you are a University of Tasmania student, you may wish to discuss any ethical concerns with a University Student Counsellor.

We would be happy to discuss your individual results with you. Overall results will be available at the completion of the project if you are interested. If you decide to withdraw from the project, we would welcome the opportunity to discuss with you any concerns you have about the project and your participation in it.

Please keep this information sheet and, if necessary, refer to the information it contains. In addition, if you agree to participate, you will be asked to sign a statement of informed consent. A copy of this statement will be supplied to you.

Thank you.

STATEMENT OF INFORMED CONSENT

Psychophysiological and Psychological Correlates of Binge Eating

I have read and understood the 'Information Sheet' for this study. The nature and possible effects of the study have been explained to me.

I understand the study involves the following:

- discussing the nature of my eating
- completing questionnaires about how I have been feeling recently;
- discussing in detail a time when I have overeaten;
- attending the laboratory and having electrodes and measurement instruments fitted so that recordings of my heart rate and cardiac measures, respiration and skin conductance can be taken while I am being asked to image aspects of a binge eating episode and neutral events.

I understand that precautions will be taken against an allergic reaction to surgical tape. I understand that all research data will be treated as confidential. Any questions that I have asked have been answered to my satisfaction. I agree to participate in this investigation and understand that I may withdraw at any time without prejudice to any treatment regimes, academic standing, or future participation in research projects. I agree that research data gathered for the study may be published provided I cannot be identified as a subject.

Name of participant: .....

Signature of participant: ..... Date: .....

I have explained this project and the implications for participation in it to this volunteer and I believe that the consent is informed and that s/he understands the implications of participation.

Name of investigator: .....

Signature of investigator: ..... Date: .....

APPENDIX B

BINGE QUESTIONNAIRE

Binge Questionnaire

Is binge eating associated with:

_____ eating more rapidly than normal

_____ eating until feeling uncomfortably full

_____ eating large amounts when not feeling physically hungry

_____ eating alone because of being embarrassed by how much you are eating

_____ feeling disgusted with oneself, depressed, or very guilty after overeating

Do you feel distressed about binge eating? YES / NO

When you are thinking about your good and bad points to what extent is your view of yourself influenced by your body shape and weight?

Not at all ——————————————— Completely

APPENDIX C

ANOVA RESULTS FOR CHAPTER 8

Table 43.

ANOVA results for the BN, BED, OW and NW groups for age.

	Sum of Squares	df	Mean Square	F	Sig.
Between Groups	1800.42	3	600.14	6.45	.001
Within Groups	5214.17	56	93.11		
Total	7014.58	59			

Table 44.

ANOVA results for the BN, BED, OW and NW groups for weight.

	Sum of Squares	df	Mean Square	F	Sig.
Between Groups	6719.98	3	2240.00	12.96	.000
Within Groups	9680.43	56	172.87		
Total	16400.41	59			

Table 45.

ANOVA results for the BN, BED, OW and NW groups for BMI.

	Sum of Squares	df	Mean Square	F	Sig.
Between Groups	843.48	3	281.16	13.96	.000
Within Groups	1128.24	56	20.15		
Total	1971.72	59			

Table 46.

ANOVA results for the BN, BED, OW and NW groups for the age of first diet.

	Sum of Squares	df	Mean Square	F	Sig.
Between Groups	13.34	1	13.34	.51	.483
Within Groups	602.66	23	26.20		
Total	616.00	24			

Table 47.

ANOVA results for the BN, BED, OW and NW groups for the age of first binge episode.

	Sum of Squares	df	Mean Square	F	Sig.
Between Groups	.91	1	.91	.04	.848
Within Groups	578.63	24	24.11		
Total	579.54	25			

Table 48.

ANOVA results for the BN, BED, OW and NW groups for the age of regular binge eating.

	Sum of Squares	df	Mean Square	F	Sig.
Between Groups	17.36	1	17.36	.63	.436
Within Groups	662.53	24	27.61		
Total	679.89	25			

Table 49.

ANOVA results for the BN, BED, OW and NW groups for EDE Restraint Subscale.

	Sum of Squares	df	Mean Square	F	Sig.
Between Groups	58.66	3	19.55	11.20	.000
Within Groups	97.77	56	1.75		
Total	156.43	59			

Table 50.

ANOVA results for the BN, BED, OW and NW groups for EDE Eating Concern Subscale.

	Sum of Squares	df	Mean Square	F	Sig.
Between Groups	62.84	3	20.95	22.16	.000
Within Groups	51.99	55	.95		
Total	114.82	58			

Table 51.

ANOVA results for the BN, BED, OW and NW groups for EDE Weight Concern Subscale.

	Sum of Squares	df	Mean Square	F	Sig.
Between Groups	96.36	3	32.12	25.74	.000
Within Groups	69.89	56	1.25		
Total	166.26	59			

Table 52.

ANOVA results for the BN, BED, OW and NW groups for EDE Shape Concern Subscale.

	Sum of Squares	df	Mean Square	F	Sig.
Between Groups	131.25	3	43.75	33.19	.000
Within Groups	73.82	56	1.32		
Total	205.07	59			

Table 53.

ANOVA results for the BN, BED, OW and NW groups for EDI-II Drive for Thinness Subscale.

	Sum of Squares	df	Mean Square	F	Sig.
Between Groups	28924.68	3	9641.56	28.81	.000
Within Groups	18408.94	55	334.71		
Total	47333.63	58			

Table 54.

ANOVA results for the BN, BED, OW and NW groups for EDI-II Bulimia Subscale.

	Sum of Squares	df	Mean Square	F	Sig.
Between Groups	11502.97	3	3834.32	20.71	.000
Within Groups	10182.27	55	185.13		
Total	21685.22	58			

Table 55.

ANOVA results for the BN, BED, OW and NW groups for EDI-II Body Dissatisfaction Subscale.

	Sum of Squares	df	Mean Square	F	Sig.
Between Groups	10574.62	3	3524.87	8.12	.000
Within Groups	23890.94	55	434.38		
Total	34465.56	58			

Table 56.

ANOVA results for the BN, BED, OW and NW groups for EDI-II Ineffectiveness Subscale.

	Sum of Squares	df	Mean Square	F	Sig.
Between Groups	8189.76	3	2729.92	10.90	.000
Within Groups	13773.09	55	250.42		
Total	21962.85	58			

Table 57.

ANOVA results for the BN, BED, OW and NW groups for EDI-II Perfectionism Subscale.

	Sum of Squares	df	Mean Square	F	Sig.
Between Groups	5151.79	3	1717.26	1.78	.162
Within Groups	53071.87	55	964.94		
Total	58223.66	58			

Table 58.

ANOVA results for the BN, BED, OW and NW groups for EDI-II Interpersonal Distrust Subscale.

	Sum of Squares	df	Mean Square	F	Sig.
Between Groups	2447.98	3	815.99	1.69	.180
Within Groups	26567.01	55	483.04		
Total	29014.98	58			

Table 59.

ANOVA results for the BN, BED, OW and NW groups for EDI-II Interoceptive Awareness Subscale.

	Sum of Squares	df	Mean Square	F	Sig.
Between Groups	15945.45	3	5315.15	14.44	.000
Within Groups	20246.08	55	368.11		
Total	36191.53	58			

Table 60.

ANOVA results for the BN, BED, OW and NW groups for EDI-II Maturity Fears Subscale.

	Sum of Squares	df	Mean Square	F	Sig.
Between Groups	3782.07	3	1260.69	2.43	.075
Within Groups	28486.88	55	517.94		
Total	32268.95	58			

Table 61.

ANOVA results for the BN, BED, OW and NW groups for EDI-II Asceticism Subscale.

	Sum of Squares	df	Mean Square	F	Sig.
Between Groups	21296.06	3	7098.69	9.17	.000
Within Groups	42560.79	55	773.83		
Total	63856.85	58			

Table 62.

ANOVA results for the BN, BED, OW and NW groups for EDI-II Impulse Regulation Subscale.

	Sum of Squares	df	Mean Square	F	Sig.
Between Groups	6668.01	3	2222.67	5.76	.002
Within Groups	21216.30	55	385.75		
Total	27884.31	58			

Table 63.

ANOVA results for the BN, BED, OW and NW groups for EDI-II Social Insecurity Subscale.

	Sum of Squares	df	Mean Square	F	Sig.
Between Groups	9622.00	3	3207.33	4.20	.010
Within Groups	42055.56	55	764.65		
Total	51677.56	58			

Table 64.

ANOVA results for the BN, BED, OW and NW groups for SCL-90-R Somatisation Subscale.

	Sum of Squares	df	Mean Square	F	Sig.
Between Groups	1849.16	3	616.39	5.77	.002
Within Groups	5874.50	55	106.81		
Total	7723.66	58			

Table 65.

ANOVA results for the BN, BED, OW and NW groups for SCL-90-R Obessive-Compulsive Subscale.

	Sum of Squares	df	Mean Square	F	Sig.
Between Groups	2439.41	3	813.14	6.81	.001
Within Groups	6564.38	55	119.35		
Total	9003.80	58			

Table 66.

ANOVA results for the BN, BED, OW and NW groups for SCL-90-R Interpersonal Sensitivity Subscale.

	Sum of Squares	df	Mean Square	F	Sig.
Between Groups	2945.67	3	981.89	7.37	.000
Within Groups	7330.57	55	133.28		
Total	10276.24	58			

Table 67.

ANOVA results for the BN, BED, OW and NW groups for SCL-90-R Depression Subscale.

	Sum of Squares	df	Mean Square	F	Sig.
Between Groups	2226.50	3	742.17	6.37	.001
Within Groups	6406.04	55	116.47		
Total	8632.54	58			

Table 68.

ANOVA results for the BN, BED, OW and NW groups for SCL-90-R Anxiety Subscale.

	Sum of Squares	df	Mean Square	F	Sig.
Between Groups	2922.25	3	974.08	7.77	.000
Within Groups	6895.86	55	125.38		
Total	9818.10	58			

Table 69.

ANOVA results for the BN, BED, OW and NW groups for SCL-90-R Hostility Subscale.

	Sum of Squares	df	Mean Square	F	Sig.
Between Groups	1834.91	3	611.64	6.70	.001
Within Groups	5017.81	55	91.23		
Total	6852.71	58			

Table 70.

ANOVA results for the BN, BED, OW and NW groups for SCL-90-R Phobic Anxiety Subscale.

	Sum of Squares	df	Mean Square	F	Sig.
Between Groups	1261.29	3	420.43	5.61	.002
Within Groups	4119.63	55	74.90		
Total	5380.92	58			

Table 71.

ANOVA results for the BN, BED, OW and NW groups for SCL-90-R Paranoid Ideation Subscale.

	Sum of Squares	df	Mean Square	F	Sig.
Between Groups	1450.21	3	483.41	4.98	.004
Within Groups	5337.31	55	97.04		
Total	6787.53	58			

Table 72.

ANOVA results for the BN, BED, OW and NW groups for SCL-90-R Psychoticism Subscale.

	Sum of Squares	df	Mean Square	F	Sig.
Between Groups	1453.81	3	484.60	4.22	.009
Within Groups	6316.87	55	114.85		
Total	7770.68	58			

Table 73.

ANOVA results for the BN, BED, OW and NW groups for SCL-90-R GSI Subscale.

	Sum of Squares	df	Mean Square	F	Sig.
Between Groups	3385.46	3	1128.49	7.29	.000
Within Groups	8518.67	55	154.89		
Total	11904.14	58			

Table 74.

ANOVA results for the BN, BED, OW and NW groups for SCL-90-R PST Subscale.

	Sum of Squares	df	Mean Square	F	Sig.
Between Groups	3280.80	3	1093.60	6.86	.001
Within Groups	8769.30	55	159.44		
Total	12050.10	58			

Table 75.

ANOVA results for the BN, BED, OW and NW groups for SCL-90-R PSDI Subscale.

	Sum of Squares	df	Mean Square	F	Sig.
Between Groups	3221.76	3	1073.92	13.96	.000
Within Groups	4230.55	55	76.92		
Total	7452.31	58			

Table 76.

ANOVA results for the BN, BED, OW and NW groups for the BDI-II.

	Sum of Squares	df	Mean Square	F	Sig.
Between Groups	1915.21	3	638.40	9.09	.000
Within Groups	3862.59	55	70.23		
Total	5777.80	58			

APPENDIX D

Examples of Imagery Scripts

A. Binge Eating Script (BN)

1. Setting the scene

Right. You are in the lounge room sitting on the floor with Jane. See the couch, and the big TV cabinet with the TV in it. Notice how warm you are feeling from the floor heating. You're feeling nonchalant. *Concentrate on that feeling right now (pause).* You could not be bothered cooking so you and Jane decided to go to Hungry Jacks. You are at home with your dinner. As you are sitting there you are wondering why your partner hasn't rang. You are feeling bloody miserable. You're sitting there analysing every little thing. *Concentrate on that feeling right now (pause).* Now open your eyes and switch that scene off.

2. Approach

Right. You have arrived home after going to Hungry Jacks. It took ages to get your food. You drove like a bat out of hell home. You have chicken burgers, chips and a chocolate thick shake. You think if you are going to be naughty, you may as well be really naughty. *Concentrate on that feeling right now (pause).* You're feeling happy and looking forward to eating. You can smell the food. It smells good. You know that you are going to eat more than you should, but you don't care. Notice that you are feeling hungry. *Concentrate on that feeling right now (pause).* Now open your eyes and switch that scene off.

3. Incident

Right. You are sitting watching the movie on TV. Start eating your dinner. The chips are delicious. Really remember how nice they tasted. You don't really like the chicken burger. It tastes liked really processed chicken. Now drink your chocolate thick shake. You're not really thinking anything. You're just focussing on eating. *Concentrate on that right now (pause).* You've finished your meal. Finish off the rest of Jane's thick shake. Jane brings out 4 liquorish blocks, eat those, decide to go the whole hog. Jane has some mousse cake from La Cuisine left over from her birthday, eat two big slices. Notice that you feel totally sick. It feels like your stomach has been pumped up with a car tire and your stomach is that tight and that full that you can hardly breath. It is a really stretched feeling. Revolting. You feel awful. You're trying to justify it to yourself. *Concentrate on that feeling right now (pause).* Now open your eyes and switch that scene off.

4. Resolution

Right. Jane is watching the video. You know that she will be occupied for a while. Lie and tell her that you are going to go to the toilet because you don't feel very well and you have a tummy ache, and you are going to go and read the newspaper for ages. Sneak into the kitchen and get a teaspoon from the drawer. Jane won't realise that a teaspoon is missing. Think how full your stomach is feeling. *Concentrate on that feeling right now (pause).* Your being very sneaky, sliding the teaspoon into your tracksuit pants so that Jane can't see it. You know that you are being mischievous. You want to get to the toilet so that you can get rid of the food.

You're feeling naughty. *Concentrate on that feeling right now (pause).* Now open your eyes and switch that scene off.

5. Consequence

Right. Walk into the toilet, realise that you have the wrong newspaper. Go out and get Sundays newspaper. You have an argument with Jane about you being excitable. Tell her that you can't change your personality. You're feeling cross with her. *Concentrate on that feeling right now (pause).* Walk back into the toilet and read the newspaper for a while. Then get the toilet paper and line the bowl so that you won't make a noise and it doesn't splash anywhere. You're hoping that you don't get caught, but you're feeling a sense of relief because you are going to get rid of that tight horrible bloated feeling. Hope to God that you don't get fat because you have waited so long and some of it would have gone through your system. *Concentrate on that feeling right now (pause).* Now open your eyes and switch that scene off.

B. Binge Eating Script (BED)

1. Setting the scene

Right. You are in the kitchen. See the brown cork tiles and the orange laminex on the benches. The doors are brown wood. See the mobiles hanging from the ceiling, the starts and moons, and little banksias and the lead light one. You have cleaned up the kitchen. Notice that it is looking quite tidy. You are cooking tea, the bolognaise is baking in the oven. Decide to make Anzac biscuits because the oven is already on. You feel like you want something sweet. *Concentrate on that feeling right now (pause).* You are feeling a bit crap because you have already eaten chocolate during the day. Think that you have already stuffed it now, so you may as well keep going. *Concentrate on that feeling right now (pause).* Now open your eyes and switch that scene off.

2. Approach

Right. The bolognaise is ready. Get out the plates and serve up the dinner. See the food on your plate. Take your plate and go and sit down. As you are eating think how delicious it is. You know that the biscuits will be cooked by the time you have eaten your dinner. You are looking forward to eating. *Concentrate on that feeling right now (pause).* You are eating your dinner. Really taste the food. As you are eating you are thinking about the biscuits that you are baking. You have finished eating your dinner. Think how full you are feeling. It is a really substantial meal. *Concentrate on that feeling right now (pause).* Now open your eyes and switch that scene off.

3. Incident

Right. Take your plate into the kitchen. The biscuits have finished cooking. Get them out of the oven. Start eating the biscuits while they are still hot. You are already feeling really full, but you eat 4 of the biscuits. You have made them bigger than you usually do. The biscuits are nice, but because you're not that hungry they are not as nice. Think, eat. *Concentrate on that feeling right now (pause).* Now that

you have finished eating the biscuits, notice that you feel sick. You feel too full, gross. You feel a bit depressed about what you have eaten, and a bit fat. *Concentrate on that feeling right now (pause).* Now open your eyes and switch that scene off.

4. Resolution

Right. You have finished eating all the biscuits. You are standing in the kitchen, feeling fat, and depressed. You feel like you have eaten too much. You know you didn't need to eat the biscuits. You're feeling guilty about eating them. *Concentrate on that feeling right now (pause).* Decide to go and watch TV. You're feeling too full to do anything else. You just want to sit down. You know that watching TV will block out all your thoughts. It will make you feel better. *Concentrate on that feeling right now (pause).* Now open your eyes and switch that scene off.

5. Consequence

Right. You are having a herbal tea and watching TV. Notice that you are starting to feel a bit better, starting to forget about what you have eaten. *Concentrate on that feeling right now (pause).* Sex in the City is on. You really like this show. It makes you laugh. Think about what you might do for the rest of the night. You might get on the internet later on. Notice that you are feeling relaxed. *Concentrate on that feeling right now (pause).* Now open your eyes and switch that scene off.

C. Overeating Script

1. Setting the Scene

Right. You are in a Mexican restaurant with your boyfriend, John. Look around you. Notice that the restaurant is quite full, there is a bit of noise. See the couple at the next table. They have a really nice meal. You are looking at their meal, wondering what they have. Notice that you are feeling really hungry. *Concentrate on that feeling right now (pause).* See the candle on the table. You decided to go to this restaurant because you have a special deal. Notice that it is fairly dim lighting. You're feeling pretty good, really hungry. *Concentrate on that feeling right now (pause).* Now open your eyes and switch that scene off.

2. Approach

Right. The waitress comes and takes your order. She is really nice. You're not sure what to have, decide to have an entree. The waitress describes a pie dish, it sounds really nice, so you and John both decide to order this. You're feeling really hungry, thinking about the meal and talking to John. *Concentrate on that feeling right now (pause).* The waitress brings the entree first. See the dips and all the corn chips. The dip tastes really nice, you are enjoying them. You're feeling relaxed and good. *Concentrate on that feeling right now (pause).* Now open your eyes and switch that scene off.

3. Incident

Right. You have finished eating the dips. Your main meal comes out. It is absolutely huge. You are already half full. Think, oh my god it is so much food, I am never going to eat it. *Concentrate on that feeling right now (pause).* Start eating. It is really, really nice. You are enjoying it, but also thinking that you are never going to be able to eat all this food, there is so much. Keep eating. Try and eat the salad stuff as well. Notice that you are starting you feel really full, but you are enjoying the meal. *Concentrate on that feeling right now (pause).* Now open your eyes and switch that scene off.

4. Resolution

Right. You've finished eating, notice that you are feeling awfully full. Your stomach feels really, really heavy. You can't believe that you ate so much food. Your stomach is hurting you are so full. *Concentrate on that feeling right now (pause).* Try and sit back in your chair and stretch your stomach. There is no way you are going to have dessert. Notice that you feel like you have eaten so much that it is sitting in your throat. You feel really disgusted that you ate so much food and that you are so full. You are disappointed that you let it get to that stage. *Concentrate on that feeling right now (pause).* Now open your eyes and switch that scene off.

5. Consequence

Right. You are sitting there feeling really full. Finish up your wine. You're feeling OK, but awful because you are so full. Ask for the bill, you want to go home. You are still feeling happy, but your body feels really bad. *Concentrate on that feeling right now (pause).* Pay the bill and leave straight away. You are going to go straight home. You want to get home so that you can lay down and stretch out your stomach. You're really aware of how uncomfortable you are feeling. *Concentrate on that feeling right now (pause).* Now open your eyes and switch that scene off.

E. Normal Eating Script

1. Setting the Scene

Right. You are standing in your kitchen. It is a really nice kitchen, part of the living area. See the nice big benches, with a motley grey colour. See the washing up on the sink and bits and pieces on the counter. See the timber doors. See the fridge and the stove. You're feeling fine. *Concentrate on that feeling right now (pause).* See the slate on the floor, and your mat over the top. You're feeling hungry, looking forward to dinner. You are cooking your meal. Notice that you are feeling happy, normal. *Concentrate on that feeling right now (pause).* Now open your eyes and switch that scene off.

2. Approach

Right. You have just about finished cooking. You have cooked pasta with a tomato and olive sauce. Grab a bowl to put it in and the strainer to strain the pasta. Get out

what you need out of the cupboard. Get the pasta and strain it in the sink. Put the pasta strainer on top of the pot. Dish the pasta out with a spaghetti server. Put the sauce on top. Put some grated cheese on top. Notice that you are feeling pretty good. *Concentrate on that feeling right now (pause).* The meal looks nice. You are thinking about what is on tellie. You can smell the food, and are looking forward to your meal. Notice that you are feeling relaxed. *Concentrate on that feeling right now (pause).* Now open your eyes and switch that scene off.

3. Incident

Right. Take your meal over to the lounge and flick through the channels. Decide to watch Judging Amy. Start eating your dinner. Notice that it tastes pretty nice. As you are eating, you are watching the TV. You are feeling relaxed. *Concentrate on that feeling right now (pause).* You are enjoying the meal. You like the olives. They are spicy chilli olives, and they taste nice. You also love the cheese. You're just watching TV, eating your dinner, and veging out. *Concentrate on that feeling right now (pause).* Now open your eyes and switch that scene off.

4. Resolution

Right. You have finished eating your meal. Decide to go back for a little bit more. Put the rest away so that John can have that for lunch. Eat the extra serve. You're feeling good, notice that you aren't quite full yet. You're still feeling relaxed. *Concentrate on that feeling right now (pause).* You have finished your meal. Notice that you are feeling full and satisfied. You are feeling comfortable as you are sitting there watching TV. *Concentrate on that feeling right now (pause).* Now open your eyes and switch that scene off.

5. Consequence

Right. Take the dishes out to the kitchen. Decide to sit back and veg out. You are sitting there watching TV. Notice that you are feeling pretty good. *Concentrate on that feeling right now (pause).* You are really relaxed. You just want to sit there and not do anything. You don't want to wash the dishes. Notice that you are not really thinking about anything, just feeling really relaxed and comfortable. *Concentrate on that feeling right now (pause).* Now open your eyes and switch that scene off.

F. Neutral Script

1. Setting the scene

Right. Walk into your bathroom. See the glass shower, the bathroom is a beige colour. See the poodle tiles. Notice the green skirting boards. See your candles around the bath. Notice that you are feeling pretty tired; your eyes are only half-open. *Concentrate on that feeling right now (pause).* See the two blue towels with purple fish on them. See the big mirror to the left of your sink. See the big window that looks out over your back yard. It is open. Notice that you can feel the cold air coming through the window. It is a cold bathroom. You're feeling fine. *Concentrate on that feeling right now (pause).* Now open your eyes and switch that scene off.

2. Approach

Right. Get the bathmat from the bath, put it next to the shower. Get your towel and put that up on the top of the shower, so that you can reach it after you have had a shower. Get undressed and just throw your clothes on the floor. The dog is lying on the floor near the shower. She always sits there when you have a shower. Open the glass door. Adjust the water. This takes ages, stand there with your hand under the water trying to get exactly the right temperature. You're feeling a bit annoyed because it takes so long for the water to get right. *Concentrate on that feeling right now (pause).* Step into the shower and close the door behind you. The water feels very nice and warm. It wakes you up, makes you feel much more alert. Stick your face under it and give your eyes a bit of a rub. Really remember how warm the water feels. You're feeling good. *Concentrate on that feeling right now (pause).* Now open your eyes and switch that scene off.

3. Incident

Right. Wet your hair. Reach for the shampoo that is hanging in the shower on a rack. Put the shampoo onto your hand, now rub the shampoo into your hair. You feel happy to be shampooing your hair because it gets really greasy. Feeling happy to finally get it washed. *Concentrate on that feeling right now (pause).* As you are washing your hair, it feels nice to get it feeling a lot cleaner. You enjoy washing your hair. Give your scalp a good massage. You really like the feeling of this. Rinse the shampoo out. Feel the water running through your hair. You're feeling happy, enjoying the shower. *Concentrate on that feeling right now (pause).* Now open your eyes and switch that scene off.

4. Resolution

Right. Put some conditioner into your hand, now put it onto your hair. Leave it there, get the body-wash from the body shop, and put that all over and give yourself a good scrub with the sponge. It is usually a quick shower. You are conscious that you are in a hurry. *Concentrate on that feeling right now (pause).* Quickly put every thing back on the rack and wash the conditioner out. You are aware that you are hurrying. Even though it is short you still really enjoy it. The shower makes you feel awake and ready. You're feeling warm and relaxed. *Concentrate on that feeling right now (pause).* Now open your eyes and switch that scene off.

5. Consequence

Right. Finished rinsing off, quickly turn off the taps and reach up for your towel. You are still standing in the shower, quickly dry your hair, then dry yourself, step out wrap the towel around you and go into your bedroom. You're feeling much more awake, feeling less tense and rushed because you know that you have finished. *Concentrate on that feeling right now (pause).* You're feeling good after your shower. As you are getting ready, think about your day and what you are going to do. Notice that you are feeling good, looking forward to the day. *Concentrate on that feeling right now (pause).* Now open your eyes and switch that scene off.

APPENDIX E

VASs - Psychophysiological

Relaxed _____ Tense

Physically _____ Physically
Comfortable Uncomfortable

How clear was the image of yourself in that scene?

Clear _____ Unclear

How close to real life was that scene?

Not Close _____ Very
Close

APPENDIX F

ANOVA RESULTS FOR CHAPTER 9

Table 77.

One way ANOVA results for the BN, BED, OW, and NW groups for the Betts QMI Vividness of Imagery scale.

	Sum of Squares	df	Mean Square	F	Sig.
Between Groups	1298.91	3	432.97	.45	.72
Within Groups	51708.98	54	957.57		
Total	53007.88	57			

Table 78.

Repeated measures ANOVA results for the BN, BED, OW, and NW groups for the VAS clear/unclear.

Source	Type III Sum of Squares	df	Mean Square	F	Sig.
SCRIPT	397.79	1.50	265.53	.55	.53
SCRIPT by GROUP	2679.33	4.49	596.16	1.24	.30
Error(SCRIPT)	40457.61	83.89	482.25		
STAGE	319.80	4.00	79.95	1.30	.27
STAGE by GROUP	1013.07	12.00	84.42	1.37	.18
Error(STAGE)	13789.83	224.00	61.56		
SCRIPT by STAGE	235.88	6.33	37.27	.55	.78
SCRIPT by STAGE by GROUP	940.12	18.99	49.52	.73	.79
Error(SCRIPT by STAGE)	23989.29	354.41	67.69		

Table 79.

Repeated measures ANOVA results for the BN, BED, OW, and NW groups for the VAS very close/not close.

Source	Type III Sum of Squares	df	Mean Square	F	Sig.
SCRIPT	397.79	1.50	265.53	.55	.53
SCRIPT by GROUP	2679.33	4.49	596.16	1.24	.30
Error(SCRIPT)	40457.61	83.90	482.23		
STAGE	319.80	4.00	79.95	1.30	.27
STAGE by GROUP	1013.07	12.00	84.42	1.37	.18
Error(STAGE)	13789.83	224.00	61.56		
SCRIPT by STAGE	235.88	6.33	37.27	.55	.78
SCRIPT by STAGE by GROUP	940.12	18.99	49.52	.73	.79
Error(SCRIPT by STAGE)	23989.29	354.41	67.69		

Table 80.

Repeated measures ANOVA results for the BN, BED, OW, and NW groups for the VAS physically comfortable/physically uncomfortable.

Source	Type III Sum of Squares	df	Mean Square	F	Sig.
SCRIPT	225172.31	1.91	118148.01	114.11	.000
SCRIPT by GROUP	39651.14	5.72	6934.99	6.70	.000
Error(SCRIPT)	110501.36	106.73	1035.36		
STAGE	17436.34	2.96	5883.57	15.05	.000
STAGE by GROUP	1896.91	8.89	213.36	.55	.84

(table continues)

Table 80. *(continued)*

Error(STAGE)	64887.28	165.96	390.98		
SCRIPT by STAGE	34843.54	4.57	7618.53	14.72	.000
SCRIPT by STAGE by GROUP	10673.97	13.72	777.95	1.50	.11
Error(SCRIPT by STAGE)	132571.02	256.12	517.62		

Table 81.

Repeated measures ANOVA results for the BN, BED, OW, and NW groups for the VAS relaxed/tense.

Source	Type III Sum of Squares	df	Mean Square	F	Sig.
SCRIPT	113021:59	1.67	67665.84	55.49	.000
SCRIPT by GROUP	51802.67	5.01	10338.06	8.48	.000
Error(SCRIPT)	114058.62	93.54	1219.41		
STAGE	2796.04	3.12	894.94	1.87	.13
STAGE by GROUP	5825.47	9.37	621.53	1.30	.24
Error(STAGE)	83759.10	174.96	478.74		
SCRIPT by STAGE	3832.24	5.48	699.77	1.47	.20
SCRIPT by STAGE by GROUP	10662.68	16.43	649.01	1.36	.16
Error(SCRIPT by STAGE)	146251.04	306.68	476.89		

Table 82.

Repeated measures ANOVA results for the BN, BED, OW, and NW groups for respiration.

Source	Type III Sum of Squares	df	Mean Square	F	Sig.
SCRIPT	6.58	1.98	3.32	.40	.67
SCRIPT by GROUP	121.41	5.94	20.44	2.44	.03
Error(SCRIPT)	830.48	98.98	8.39		
STAGE	5.61	3.36	1.67	.51	.70
STAGE by GROUP	48.32	10.08	4.79	1.47	.16
Error(STAGE)	548.47	168.07	3.26		
SCRIPT by STAGE	17.20	8.00	2.15	1.20	.30
SCRIPT by STAGE by GROUP	69.40	24.00	2.89	1.61	.04
Error(SCRIPT by STAGE)	717.75	400.00	1.79		

Table 83.

Repeated measures ANOVA results for the BN, BED, OW, and NW groups for heart rate.

Source	Type III Sum of Squares	df	Mean Square	F	Sig.
SCRIPT	218.82	2.00	109.41	2.79	.066
SCRIPT by GROUP	257.12	6.00	42.85	1.09	.37
Error(SCRIPT)	4395.73	112.00	39.25		

(table continues)

Table 83. *(continued)*

STAGE	22.12	4.00	5.53	1.03	.39
STAGE by GROUP	167.46	12.00	13.96	2.60	.003
Error(STAGE)	1200.27	224.00	5.36		
SCRIPT by STAGE	50.70	8.00	6.34	1.56	.13
SCRIPT by STAGE by GROUP	107.86	24.00	4.49	1.11	.33
Error(SCRIPT by STAGE)	1815.95	448.00	4.05		

APPENDIX G

Mean Scores and Standard Deviations for the Imagery Scales

Table 84.

Mean scores and standard deviations for the four groups at each stage of each script for the VAS clear/unclear.

		BN		BED		NW		OW	
		M	SD	M	SD	M	SD	M	SD
Binge Eating	Scene	88.14	12.60	83.58	19.80	87.71	16.48	92.12	10.93
	Approach	91.71	10.92	85.95	19.19	85.76	15.49	89.24	11.72
	Incident	90.29	13.64	85.11	21.26	87.82	15.80	91.71	12.17
	Resolution	92.29	16.06	87.05	21.07	84.71	18.64	92.35	14.41
	Consequence	89.00	17.08	84.58	24.50	85.18	14.95	93.82	7.54
Normal Eating	Scene	80.43	14.02	90.00	10.86	88.06	9.75	95.35	5.12
	Approach	76.86	23.89	89.11	15.59	86.18	12.05	95.35	6.00
	Incident	84.14	16.90	91.11	13.88	84.88	13.88	93.29	14.46
	Resolution	87.14	15.27	89.42	17.25	89.05	10.35	94.76	7.40
	Consequence	88.00	11.30	92.21	9.17	84.94	16.75	95.29	8.14
Neutral	Scene	87.86	10.73	91.95	9.46	88.06	12.22	94.76	8.04
	Approach	85.71	16.29	91.32	9.70	86.00	12.17	93.24	10.39
	Incident	91.14	5.90	90.53	10.75	85.59	15.16	90.94	16.93
	Resolution	92.00	7.64	91.16	10.40	85.24	16.77	92.29	12.53
	Consequence	91.57	9.31	91.90	9.88	83.71	19.73	96.76	5.26

Table 85.

Mean scores and standard deviations for the four groups at each stage of each script for the VAS very close/not close.

		BN		BED		NW		OW	
		M	SD	M	SD	M	SD	M	SD
Binge Eating	Scene	85.57	16.60	85.32	16.35	86.29	18.22	91.76	10.74
	Approach	87.57	18.87	90.21	11.77	86.71	17.63	90.59	10.74
	Incident	82.57	25.33	88.26	17.21	87.94	14.89	90.59	11.87
	Resolution	77.00	36.22	93.05	8.50	82.71	19.77	92.12	11.92
	Consequence	86.00	21.12	92.21	9.98	86.35	16.27	92.65	9.57
Normal Eating	Scene	82.00	17.38	89.53	9.83	89.00	9.56	88.47	12.99
	Approach	81.14	18.53	86.90	13.69	86.29	11.03	93.94	7.77
	Incident	83.86	19.39	92.74	7.31	86.06	11.71	94.82	6.24
	Resolution	83.29	19.08	91.05	9.90	90.24	8.92	93.41	9.70
	Consequence	85.71	15.28	90.95	9.51	84.35	16.36	91.88	11.47
Neutral	Scene	88.14	10.19	88.16	11.15	89.12	12.12	93.18	10.18
	Approach	88.86	11.51	90.37	10.51	86.41	15.66	93.59	10.60
	Incident	89.86	9.86	91.00	11.27	85.41	18.70	94.76	8.77
	Resolution	92.43	9.31	89.26	11.23	85.18	17.45	93.00	10.36
	Consequence	90.29	10.01	89.26	12.94	84.76	15.04	94.35	9.11

Table 86.

Mean scores and standard deviations for each group on the Betts QMI Vividness of Imagery Scale.

	BN		BED		NW		OW	
	M	SD	M	SD	M	SD	M	SD
Imagery Score	77.14	27.70	91.18	34.83	84.29	24.88	81.41	33.35

APPENDIX H

Mean Scores and Standard Deviations for the Psychophysiological VAS

Table 87.

Mean scores and standard deviations for the BN, BED, NW and OW groups across the five stages of the three different script, binge eating, normal eating and neutral, for the VAS physically comfortable/physically uncomfortable.

		BN		BED		NW		OW	
		M	*SD*	*M*	*SD*	*M*	*SD*	*M*	*SD*
Binge Eating	Scene	63.86	18.56	48.84	32.15	8.76	18.31	24.06	34.46
	Approach	67.57	29.07	54.21	26.55	9.94	15.82	20.29	26.94
	Incident	78.57	28.58	71.58	23.45	15.65	16.11	34.76	36.00
	Resolution	94.00	7.46	82.74	20.45	41.77	34.45	60.71	37.63
	Consequence	80.00	31.77	79.47	25.30	45.35	38.92	62.24	32.10
Normal Eating	Scene	21.43	9.25	23.53	22.55	13.18	19.98	10.29	15.41
	Approach	27.57	19.32	19.53	15.97	14.12	20.02	12.24	21.07
	Incident	38.57	27.12	17.74	15.26	8.82	12.68	5.94	9.61
	Resolution	46.57	36.52	24.79	28.09	7.47	13.32	7.88	12.85
	Consequence	45.71	28.31	24.11	26.37	7.29	16.98	3.35	4.29
Neutral	Scene	23.71	16.94	19.90	23.17	16.41	24.44	9.24	18.42
	Approach	19.86	14.68	25.63	34.25	6.35	8.15	4.47	8.84
	Incident	16.00	15.29	16.21	17.83	5.47	9.71	3.35	7.96
	Resolution	14.86	18.61	20.95	23.89	5.53	10.28	3.18	4.53
	Consequence	13.86	16.99	25.00	27.66	8.94	15.94	8.47	20.18

Table 88.

Mean scores and standard deviations for the BN, BED, NW and OW groups across the five stages of the three different script, binge eating, normal eating and neutral, for the VAS relaxed/tense.

		BN		BED		NW		OW	
		M	*SD*	*M*	*SD*	*M*	*SD*	*M*	*SD*
Binge Eating	Scene	80.86	12.93	50.68	33.68	13.71	22.66	27.81	32.70
	Approach	76.86	20.06	64.26	25.63	14.00	21.90	26.13	34.39
	Incident	72.71	35.15	66.16	28.22	16.47	19.99	14.13	26.12
	Resolution	86.86	19.60	77.00	19.31	11.77	15.09	27.06	28.88
	Consequence	67.29	33.38	59.79	33.25	19.59	22.54	27.06	29.70
Normal Eating	Scene	39.14	31.49	35.05	31.12	17.06	21.35	13.75	21.18
	Approach	24.29	17.45	32.42	30.69	15.18	24.74	7.56	10.24
	Incident	32.86	23.85	29.00	28.80	13.65	21.40	12.63	17.47
	Resolution	45.00	31.33	29.63	29.25	5.00	6.09	9.56	18.04
	Consequence	30.00	20.79	40.58	39.55	10.12	20.10	5.44	9.83
Neutral	Scene	16.57	15.85	26.26	25.68	16.41	21.61	17.88	20.35
	Approach	17.71	18.28	22.95	24.85	7.24	10.68	10.25	13.76
	Incident	21.43	26.18	16.05	17.02	4.18	7.09	7.25	15.37
	Resolution	24.86	27.08	28.16	26.48	12.59	21.65	7.94	13.70
	Consequence	31.14	30.85	31.53	31.86	13.35	15.39	9.63	20.79

APPENDIX I

Stimulus Response Inventory

Stimulus Response Inventory of Eating Situations

How would you react to the following situations? Circle one number on each scale

Eating alone at home

Do you feel?

Embarrassed	Not at all	0	1	2	3	4	Very much
Anxious	Not at all	0	1	2	3	4	Very much
Distressed	Not at all	0	1	2	3	4	Very much
Disgusted	Not at all	0	1	2	3	4	Very much
Guilty	Not at all	0	1	2	3	4	Very much
Hungry	Not at all	0	1	2	3	4	Very much
In control	Not at all	0	1	2	3	4	Very much
Sad	Not at all	0	1	2	3	4	Very much

Eating in front of your family/friends

Do you feel?

Embarrassed	Not at all	0	1	2	3	4	Very much
Anxious	Not at all	0	1	2	3	4	Very much
Distressed	Not at all	0	1	2	3	4	Very much
Disgusted	Not at all	0	1	2	3	4	Very much
Guilty	Not at all	0	1	2	3	4	Very much
Hungry	Not at all	0	1	2	3	4	Very much
In control	Not at all	0	1	2	3	4	Very much
Sad	Not at all	0	1	2	3	4	Very much

Eating in public

Do you feel?

Embarrassed	Not at all	0	1	2	3	4	Very much
Anxious	Not at all	0	1	2	3	4	Very much
Distressed	Not at all	0	1	2	3	4	Very much
Disgusted	Not at all	0	1	2	3	4	Very much
Guilty	Not at all	0	1	2	3	4	Very much
Hungry	Not at all	0	1	2	3	4	Very much
In control	Not at all	0	1	2	3	4	Very much
Sad	Not at all	0	1	2	3	4	Very much

Eating when you are bored

Do you feel?

Embarrassed	Not at all	0	1	2	3	4	Very much
Anxious	Not at all	0	1	2	3	4	Very much
Distressed	Not at all	0	1	2	3	4	Very much
Disgusted	Not at all	0	1	2	3	4	Very much
Guilty	Not at all	0	1	2	3	4	Very much
Hungry	Not at all	0	1	2	3	4	Very much
In control	Not at all	0	1	2	3	4	Very much
Sad	Not at all	0	1	2	3	4	Very much

Eating when you are upset

Do you feel?

Embarrassed	Not at all	0	1	2	3	4	Very much
Anxious	Not at all	0	1	2	3	4	Very much
Distressed	Not at all	0	1	2	3	4	Very much
Disgusted	Not at all	0	1	2	3	4	Very much
Guilty	Not at all	0	1	2	3	4	Very much
Hungry	Not at all	0	1	2	3	4	Very much
In control	Not at all	0	1	2	3	4	Very much
Sad	Not at all	0	1	2	3	4	Very much

Eating when you are tired

Do you feel?

Embarrassed	Not at all	0	1	2	3	4	Very much
Anxious	Not at all	0	1	2	3	4	Very much
Distressed	Not at all	0	1	2	3	4	Very much
Disgusted	Not at all	0	1	2	3	4	Very much
Guilty	Not at all	0	1	2	3	4	Very much
Hungry	Not at all	0	1	2	3	4	Very much
In control	Not at all	0	1	2	3	4	Very much
Sad	Not at all	0	1	2	3	4	Very much

Eating when you feel good

Do you feel?

Embarrassed	Not at all	0	1	2	3	4	Very much
Anxious	Not at all	0	1	2	3	4	Very much
Distressed	Not at all	0	1	2	3	4	Very much
Disgusted	Not at all	0	1	2	3	4	Very much
Guilty	Not at all	0	1	2	3	4	Very much
Hungry	Not at all	0	1	2	3	4	Very much
In control	Not at all	0	1	2	3	4	Very much
Sad	Not at all	0	1	2	3	4	Very much

APPENDIX J

VASs - Emotions

Happy ——————————————— Sad

Unafraid ——————————————— Afraid

Untroubled ——————————————— Guilty

APPENDIX K

ANOVA RESULTS FOR CHAPTER 10

Table 89.

ANOVA results for the BN, BED, OW, and NW groups for emotional responses on the SRI eating alone at home subscale.

		Sum of Squares	df	Mean Square	F	Sig.
Embarrassed	Between Groups	1.01	3	.34	1.99	.127
	Within Groups	9.30	55	.17		
	Total	10.31	58			
Anxious	Between Groups	17.66	3	5.89	6.11	.001
	Within Groups	53.02	55	.96		
	Total	70.68	58			
Distressed	Between Groups	9.41	3	3.14	3.51	.021
	Within Groups	49.14	55	.89		
	Total	58.54	58			
Disgusted	Between Groups	17.21	3	5.74	4.90	.004
	Within Groups	64.45	55	1.17		
	Total	81.66	58			
Guilty	Between Groups	19.53	3	6.51	5.16	.003
	Within Groups	69.46	55	1.26		
	Total	88.98	58			
Hungry	Between Groups	3.06	3	1.02	.85	.473
	Within Groups	66.12	55	1.20		
	Total	69.19	58			
In Control	Between Groups	41.69	3	13.90	10.48	.000

(table continues)

Table 89. *(continued)*

	Within Groups	72.96	55	1.33		
	Total	114.64	58			
Sad	Between Groups	13.58	3	4.53	3.89	.014
	Within Groups	64.05	55	1.16		
	Total	77.63	58			

Table 90.

ANOVA results for the BN, BED, OW, and NW groups for emotional responses on the SRI eating in front of family and friends subscale.

		Sum of Squares	df	Mean Square	F	Sig.
Embarrassed	Between Groups	20.70	3	6.90	10.14	.000
	Within Groups	37.41	55	.68		
	Total	58.10	58			
Anxious	Between Groups	32.55	3	10.85	15.54	.000
	Within Groups	38.40	55	.70		
	Total	70.95	58			
Distressed	Between Groups	19.46	3	6.49	9.13	.000
	Within Groups	39.08	55	.71		
	Total	58.54	58			
Disgusted	Between Groups	18.72	3	6.21	9.56	.000
	Within Groups	35.92	55	.63		
	Total	54.64	58			

(table continues)

Table 90. *(continued)*

Guilty	Between Groups	33.71	3	11.24	15.28	.000
	Within Groups	40.46	55	.74		
	Total	74.17	58			
Hungry	Between Groups	2.23	3	.74	.58	.629
	Within Groups	70.08	55	1.27		
	Total	72.31	58			
In Control	Between Groups	31.51	3	10.50	12.84	.000
	Within Groups	45.00	55	.82		
	Total	76.51	58			
Sad	Between Groups	14.01	3	4.70	8.38	.000
	Within Groups	30.64	55	.56		
	Total	44.64	58			

Table 91.

ANOVA results for the BN, BED, OW, and NW groups for emotional responses on the SRI eating in public subscale.

		Sum of Squares	df	Mean Square	F	Sig.
Embarrassed	Between Groups	32.50	3	10.83	9.26	.000
	Within Groups	64.35	55	1.17		
	Total	96.85	58			
Anxious	Between Groups	30.76	3	10.25	9.85	.000
	Within Groups	57.24	55	1.04		

(table continues)

Table 91. *(continued)*

	Total	88.00	58			
Distressed	Between Groups	17.10	3	5.70	5.43	.002
	Within Groups	57.78	55	1.05		
	Total	74.88	58			
Disgusted	Between Groups	10.54	3	3.51	3.46	.022
	Within Groups	55.87	55	1.02		
	Total	66.41	58			
Guilty	Between Groups	22.08	3	7.36	6.44	.001
	Within Groups	62.84	55	1.14		
	Total	84.92	58			
Hungry	Between Groups	.29	3	.10	.07	.977
	Within Groups	78.22	55	1.42		
	Total	78.51	58			
In Control	Between Groups	28.54	3	9.52	8.56	.000
	Within Groups	61.12	55	1.11		
	Total	89.66	58			
Sad	Between Groups	10.18	3	3.39	3.43	.023
	Within Groups	54.47	55	.99		
	Total	64.64	58			

Table 92.

ANOVA results for the BN, BED, OW, and NW groups for emotional responses on the SRI eating when feeling bored subscale.

		Sum of Squares	df	Mean Square	F	Sig.
Embarrassed	Between Groups	25.68	3	8.56	10.16	.000
	Within Groups	46.35	55	.84		
	Total	72.03	58			
Anxious	Between Groups	42.19	3	14.06	13.35	.000
	Within Groups	57.95	55	1.05		
	Total	100.14	58			
Distressed	Between Groups	31.72	3	10.57	9.02	.000
	Within Groups	64.45	55	1.17		
	Total	96.17	58			
Disgusted	Between Groups	42.12	3	14.04	10.08	.000
	Within Groups	76.63	55	1.39		
	Total	118.75	58			
Guilty	Between Groups	21.37	3	7.12	5.23	.003
	Within Groups	73.61	54	1.36		
	Total	94.98	57			
Hungry	Between Groups	10.63	3	3.54	2.90	.043
	Within Groups	67.10	55	1.22		
	Total	77.73	58			
In Control	Between Groups	19.38	3	6.46	4.32	.008

(table continues)

Table 92. *(continued)*

	Within Groups	82.24	55	1.50		
	Total	101.63	58			
Sad	Between Groups	38.29	3	12.76	14.15	.000
	Within Groups	48.70	54	.90		
	Total	86.98	57			

Table 93.

ANOVA results for the BN, BED, OW, and NW groups for emotional responses on the SRI eating when feeling upset subscale.

		Sum of Squares	df	Mean Square	F	Sig.
Embarrassed	Between Groups	23.86	3	7.95	6.27	.001
	Within Groups	69.81	55	1.27		
	Total	93.66	58			
Anxious	Between Groups	57.04	3	19.01	16.29	.000
	Within Groups	64.19	55	1.17		
	Total	121.22	58			
Distressed	Between Groups	47.21	3	15.74	18.14	.000
	Within Groups	47.70	55	.87		
	Total	94.92	58			
Disgusted	Between Groups	78.83	3	26.28	19.04	.000
	Within Groups	75.92	55	1.38		
	Total	154.75	58			

(table continues)

Table 93. *(continued)*

Guilty	Between Groups	61.31	3	20.44	14.86	.000
	Within Groups	75.64	55	1.38		
	Total	136.95	58			
Hungry	Between Groups	8.89	3	2.96	2.58	.062
	Within Groups	63.05	55	1.15		
	Total	71.93	58			
In Control	Between Groups	36.00	3	12.00	9.63	.000
	Within Groups	68.54	55	1.25		
	Total	104.54	58			
Sad	Between Groups	33.85	3	11.29	6.14	.001
	Within Groups	101.13	55	1.84		
	Total	134.98	58			

Table 94.

ANOVA results for the BN, BED, OW, and NW groups for emotional responses on the SRI eating when feeling tired subscale.

		Sum of Squares	df	Mean Square	F	Sig.
Embarrassed	Between Groups	9.14	3	3.05	7.49	.000
	Within Groups	21.98	54	.41		
	Total	31.12	57			
Anxious	Between Groups	18.35	3	6.12	8.32	.000

(table continues)

Table 94. *(continued)*

	Within Groups	39.72	54	.74		
	Total	58.07	57			
Distressed	Between Groups	12.54	3	4.17	5.67	.002
	Within Groups	39.71	54	.74		
	Total	52.22	57			
Disgusted	Between Groups	21.53	3	7.18	6.13	.001
	Within Groups	63.24	54	1.17		
	Total	84.78	57			
Guilty	Between Groups	34.51	3	11.50	7.93	.000
	Within Groups	78.33	54	1.45		
	Total	112.85	57			
Hungry	Between Groups	6.89	3	2.30	1.39	.256
	Within Groups	89.18	54	1.65		
	Total	96.07	57			
In Control	Between Groups	18.78	3	6.26	4.05	.011
	Within Groups	83.38	54	1.54		
	Total	102.16	57			
Sad	Between Groups	11.59	3	3.86	4.32	.008
	Within Groups	48.29	54	.89		
	Total	59.88	57			

Table 95.

ANOVA results for the BN, BED, OW, and NW groups for emotional responses on the SRI eating when feeling happy subscale.

		Sum of Squares	df	Mean Square	F	Sig.
Embarrassed	Between Groups	5.79	3	1.93	9.52	.000
	Within Groups	11.16	55	.20		
	Total	16.95	58			
Anxious	Between Groups	9.50	3	3.17	6.57	.001
	Within Groups	26.53	55	.48		
	Total	36.03	58			
Distressed	Between Groups	5.67	3	1.89	3.56	.020
	Within Groups	29.21	55	.53		
	Total	34.88	58			
Disgusted	Between Groups	9.06	3	3.02	6.43	.001
	Within Groups	25.83	55	.47		
	Total	34.88	58			
Guilty	Between Groups	21.20	3	7.07	8.63	.000
	Within Groups	45.04	55	.82		
	Total	66.24	58			
Hungry	Between Groups	4.57	3	1.52	.96	.418
	Within Groups	87.16	55	1.59		
	Total	91.73	58			
In Control	Between Groups	18.33	3	6.11	5.04	.004

(table continues)

Table 95. *(continued)*

	Within Groups	66.65	55	1.21		
	Total	84.98	58			
Sad	Between Groups	4.82	3	1.61	3.39	.024
	Within Groups	26.07	55	.47		
	Total	30.88	58			

Table 96.

ANOVA results for the BN, BED, OW, and NW groups for six emotional responses for three eating situations.

Source	Type III Sum of Squares	df	Mean Square	F	Sig.
SITUATN	4.28	1.94	2.20	2.04	.136
SITUATN by GROUP	19.44	5.83	3.34	3.10	.008
Error(SITUATN)	115.17	106.81	1.08		
EMOTION	19.52	4.14	4.71	7.82	.000
EMOTION by GROUP	8.44	12.43	.68	1.13	.337
Error(EMOTION)	137.22	227.89	.60		
SITUATN by EMOTION	27.90	7.84	3.56	12.07	.000
SITUATN by EMOTION by GROUP	13.95	23.51	.59	2.01	.004
Error(SITUATN by EMOTION)	127.11	431.09	.30		

Table 97.

ANOVA results for the BN, BED, OW, and NW groups for six emotional responses for four emotion laden eating situations.

Source	Type III Sum of Squares	df	Mean Square	F	Sig.
SITUATN	292.54	2.98	98.33	56.66	.000
SITUATN by GROUP	62.02	8.93	6.95	4.00	.000
Error(SITUATN)	268.48	154.71	1.74		
EMOTION	70.30	4.16	16.89	23.16	.000
EMOTION by GROUP	31.14	12.49	2.49	3.42	.000
Error(EMOTION)	157.86	216.49	.73		
SITUATN by EMOTION	36.42	11.46	3.18	8.28	.000
SITUATN by EMOTION by GROUP	23.96	34.37	.70	1.82	.003
Error(SITUATN by EMOTION)	228.70	595.75	.38		

Table 98.

Repeated measures ANOVA results for the BN, BED, OW, and NW groups for the VAS happy/sad.

Source	Type III Sum of Squares	df	Mean Square	F	Sig.
SCRIPT	123834.81	1.86	66423.64	83.24	.000
SCRIPT by GROUP	90415.93	5.59	16166.04	20.26	.000
Error(SCRIPT)	83314.47	104.40	798.02		
STAGE	3250.30	3.01	1079.99	4.15	.007
STAGE by GROUP	8742.43	9.03	968.29	3.72	.000
Error(STAGE)	43820.96	168.54	260.01		
SCRIPT by STAGE	8293.32	4.54	1826.02	5.84	.000
SCRIPT by STAGE by GROUP	5054.29	13.63	370.95	1.19	.287
Error(SCRIPT BY STAGE)	79517.47	254.34	312.65		

Table 99.

Repeated measures ANOVA results for the BN, BED, OW, and NW groups for the VAS unafraid/afraid.

Source	Type III Sum of Squares	df	Mean Square	F	Sig.
SCRIPT	89384.46	1.59	56157.10	45.90	.000
SCRIPT by GROUP	65713.00	4.78	13761.72	11.25	.000
Error(SCRIPT)	109059.45	89.13	1223.54		
STAGE	1267.43	3.50	361.79	2.63	.043
STAGE by GROUP	1593.26	10.51	151.60	1.10	.362
Error(STAGE)	26984.98	196.18	137.55		
SCRIPT by STAGE	2381.87	4.92	484.64	1.854	.105
SCRIPT by STAGE by GROUP	4529.44	14.744	307.204	1.174	.293
Error(SCRIPT BY STAGE)	72085.11	275.22	261.92		

Table 100.

Repeated measures ANOVA results for the BN, BED, OW, and NW groups for the VAS untroubled/guilty.

Source	Type III Sum of Squares	df	Mean Square	F	Sig.
SCRIPT	198612.64	1.74	114284.73	133.70	.000
SCRIPT by GROUP	80219.60	5.21	15386.53	18.00	.000
Error(SCRIPT)	83186.17	97.32	854.76		
STAGE	23400.73	3.20	7303.03	27.56	.000
STAGE by GROUP	4501.87	9.61	468.32	1.77	.072
Error(STAGE)	47545.95	179.44	264.97		
SCRIPT by STAGE	10270.03	5.14	1996.62	5.59	.000
SCRIPT by STAGE by GROUP	8079.98	15.43	523.62	1.47	.114
Error(SCRIPT BY STAGE)	102861.44	288.05	357.10		

APPENDIX L

Mean Scores and Standard Deviations for the SRI

Table 101.

Mean scores and standard deviations for the BN, BED, OW, and NW groups for the situation eating when alone at home.

	BN		BED		OW		NW	
	M	SD	M	SD	M	SD	M	SD
Embarrassed	0.29	0.49	0.32	0.58	0.12	0.33	0.00	0.00
Anxious	1.29	1.11	1.37	1.17	0.53	1.13	0.06	0.25
Distressed	0.57	1.13	1.11	1.10	0.35	1.06	0.13	0.34
Disgusted	1.14	1.46	1.37	1.38	0.47	1.01	0.06	0.25
Guilty	1.57	1.40	1.63	1.38	0.65	1.06	0.31	0.60
Hungry	2.43	0.98	2.00	1.05	2.18	1.13	2.56	1.15
In control	2.00	1.53	1.47	1.22	3.18	1.13	3.38	0.89
Sad	1.29	1.38	1.42	1.22	0.47	1.01	0.38	0.81

Table 102.

Mean scores and standard deviations for the BN, BED, OW, and NW groups for the situation eating in front of family or friends.

	BN		BED		OW		NW	
	M	SD	M	SD	M	SD	M	SD
Embarrassed	1.71	1.25	1.21	0.92	0.35	0.86	0.06	0.25
Anxious	2.14	1.07	1.42	1.12	0.18	0.53	0.19	0.54
Distressed	1.71	1.50	0.95	1.08	0.12	0.49	0.06	0.25
Disgusted	1.71	1.50	0.90	0.99	0.12	0.49	0.06	0.25

(table continues)

Table 102 *(continued)*

Guilty	2.43	1.13	1.37	1.07	0.35	0.70	0.19	0.54
Hungry	2.29	1.11	1.95	0.97	2.12	1.17	2.44	1.26
In control	2.00	1.00	1.84	0.90	3.18	0.95	3.50	0.82
Sad	1.42	1.40	0.79	0.98	0.13	0.34	0.00	0.00

Table 103.

Mean scores and standard deviations for the BN, BED, OW, and NW groups for the situation eating in public.

	BN		BED		OW		NW	
	M	SD	M	SD	M	SD	M	SD
Embarrassed	2.00	1.53	1.84	1.26	0.35	0.79	0.44	0.89
Anxious	2.00	1.16	1.74	1.33	0.41	0.87	0.31	0.60
Distressed	1.14	1.68	1.32	1.25	0.35	0.86	0.06	0.25
Disgusted	1.29	1.70	0.95	1.18	0.24	0.56	0.19	0.75
Guilty	1.71	1.70	1.47	1.35	0.47	0.72	0.19	0.54
Hungry	2.29	1.11	2.21	1.18	2.35	1.06	2.38	1.36
In control	2.14	1.22	1.90	1.20	3.18	0.95	3.50	0.89
Sad	1.00	1.53	1.00	1.33	0.29	0.69	0.06	0.25

Table 104.

Mean scores and standard deviations for the BN, BED, OW, and NW groups for the situation eating when bored.

	BN		BED		OW		NW	
	M	SD	M	SD	M	SD	M	SD
Embarrassed	2.29	1.50	0.68	1.11	0.35	0.79	0.06	0.25
Anxious	2.57	1.13	2.00	1.20	0.47	0.87	0.50	0.89
Distressed	2.29	1.38	1.79	1.13	0.59	1.12	0.38	0.81
Disgusted	3.00	1.16	2.21	1.32	0.82	1.02	0.75	1.18
Guilty	3.00	0.82	2.53	1.31	1.69	1.25	1.31	1.01
Hungry	2.00	1.63	0.58	1.07	0.82	0.88	1.00	1.10
In control	1.14	1.22	1.26	1.15	2.12	1.32	2.56	1.21
Sad	2.43	0.98	1.68	1.29	0.31	0.48	0.31	0.79

Table 105.

Mean scores and standard deviations for the BN, BED, OW, and NW groups for the situation eating when upset.

	BN		BED		OW		NW	
	M	SD	M	SD	M	SD	M	SD
Embarrassed	2.00	1.63	1.16	1.61	0.29	0.59	0.13	0.34
Anxious	3.00	1.00	2.63	1.17	1.12	1.22	0.50	0.82
Distressed	2.86	0.90	2.84	0.83	1.35	1.06	0.81	0.91
Disgusted	3.00	0.82	2.74	1.49	0.47	1.07	0.50	0.97

(table continues)

Table 105. *(continued)*

Guilty	3.00	0.82	2.95	1.13	0.94	1.39	0.88	1.09
Hungry	2.00	0.82	0.68	1.00	1.06	1.39	1.00	0.82
In control	1.00	0.82	0.58	0.84	2.18	1.29	2.31	1.30
Sad	3.29	0.76	2.63	1.42	1.29	1.56	1.38	1.46

Table 106.

Mean scores and standard deviations for the BN, BED, OW, and NW groups for the situation eating when tired.

	BN		BED		OW		NW	
	M	SD	M	SD	M	SD	M	SD
Embarrassed	1.29	1.60	0.8	0.58	0.06	0.24	0.00	0.00
Anxious	1.57	1.40	1.06	1.06	0.24	0.75	0.00	1.14
Distressed	1.57	1.51	0.83	0.86	0.24	0.75	0.19	0.54
Disgusted	1.43	1.81	1.33	1.37	0.29	0.85	0.00	0.00
Guilty	2.00	1.29	1.89	1.53	0.59	1.23	0.19	0.54
Hungry	1.71	0.76	1.06	1.26	1.24	1.48	1.88	1.26
In control	1.71	0.49	1.39	1.20	2.53	1.38	2.69	1.35
Sad	1.43	1.27	0.94	1.11	0.35	1.00	0.13	0.34

Table 107.

Mean scores and standard deviations for the BN, BED, OW, and NW groups for the situation eating when happy.

	BN		BED		OW		NW	
	M	SD	M	SD	M	SD	M	SD
Embarrassed	1.00	1.16	0.21	0.42	0.00	0.00	0.00	0.00
Anxious	1.29	1.11	0.58	0.77	0.18	0.73	0.00	0.00
Distressed	1.00	1.00	0.47	0.91	0.18	0.73	0.00	0.00
Disgusted	1.29	1.25	0.42	0.84	0.12	0.49	0.00	0.00
Guilty	2.00	1.41	0.79	0.98	0.35	1.00	0.00	0.00
Hungry	2.00	1.16	1.79	1.18	2.00	1.06	2.50	1.55
In control	2.43	1.13	2.47	1.35	3.12	1.22	3.81	0.40
Sad	0.86	1.22	0.53	0.84	0.18	0.53	0.00	0.00

APPENDIX M

Mean Scores and Standard Deviations for the Emotion VASs

Table 108.

Mean scores and standard deviations for the BN, BED, NW and OW groups across the five stages of the three different script, binge eating, normal eating and neutral, for the VAS unafraid/afraid.

		BN		BED		NW		OW	
		M	SD	M	SD	M	SD	M	SD
Binge Eating	Scene	71.86	16.27	54.47	34.02	2.82	7.55	15.44	28.05
	Approach	73.86	23.55	59.47	34.35	4.65	10.28	17.63	29.93
	Incident	66.29	37.66	61.63	33.68	3.41	6.26	12.63	23.12
	Resolution	78.43	23.39	62.00	35.07	2.00	4.40	12.88	28.55
	Consequence	59.14	30.67	48.21	35.36	5.82	17.85	10.56	25.23
Normal Eating	Scene	41.00	33.83	24.21	26.98	2.47	4.93	4.81	9.52
	Approach	29.43	23.12	23.47	25.33	2.59	4.69	3.00	5.05
	Incident	39.14	29.12	23.53	25.51	2.94	5.12	3.69	6.69
	Resolution	44.57	32.64	20.05	23.93	1.29	1.96	5.19	13.31
	Consequence	32.29	16.49	26.26	34.20	2.24	5.59	2.00	3.39
Neutral	Scene	13.86	16.57	12.32	17.12	1.47	4.58	5.31	12.08
	Approach	15.00	17.34	14.95	17.06	1.65	3.10	6.50	15.45
	Incident	18.00	17.44	13.21	18.36	2.12	5.64	7.44	20.60
	Resolution	15.71	18.97	27.21	30.35	3.77	13.49	9.44	25.25
	Consequence	21.71	22.04	17.21	19.85	4.29	9.14	5.50	14.38

Table 109.

Mean scores and standard deviations for the BN, BED, NW and OW groups across the five stages of the three different script, binge eating, normal eating and neutral, for the VAS happy/sad.

		BN		BED		NW		OW	
		M	SD	M	SD	M	SD	M	SD
Binge Eating	Scene	68.29	19.68	48.11	31.75	4.65	7.95	16.13	26.52
	Approach	80.00	12.00	59.95	29.97	9.35	19.66	12.88	23.27
	Incident	79.43	31.03	73.63	23.58	8.12	23.39	9.88	20.13
	Resolution	88.57	14.92	85.26	13.32	10.53	19.66	19.31	27.60
	Consequence	81.86	22.44	77.53	26.92	15.53	23.96	17.94	24.53
Normal Eating	Scene	23.00	19.97	24.26	17.85	13.18	15.11	10.56	14.62
	Approach	27.14	19.07	26.32	20.96	8.29	11.39	7.19	9.51
	Incident	33.00	21.60	28.37	27.78	9.88	12.16	5.25	6.06
	Resolution	42.86	23.31	31.68	28.61	6.71	9.49	8.56	15.49
	Consequence	33.71	17.92	32.32	31.67	10.47	15.14	4.56	5.70
Neutral	Scene	20.86	16.77	24.68	20.13	15.00	15.57	16.25	14.83
	Approach	25.00	21.22	24.05	19.49	7.12	9.25	8.13	13.44
	Incident	13.29	18.05	19.21	21.89	6.18	14.80	4.25	8.96
	Resolution	17.43	19.12	24.37	25.76	6.47	13.59	4.75	10.35
	Consequence	20.29	18.58	22.37	20.61	8.53	10.96	5.25	12.28

Table 110.

Mean scores and standard deviations for the BN, BED, NW and OW groups across the five stages of the three different script, binge eating, normal eating and neutral, for the VAS untroubled/guilty.

		BN		BED		NW		OW	
		M	SD	M	SD	M	SD	M	SD
Binge Eating	Scene	69.43	20.17	50.11	31.48	2.59	3.43	11.00	24.85
	Approach	80.14	12.14	68.95	26.21	8.88	13.75	13.31	27.16
	Incident	86.43	16.82	80.95	24.64	15.71	22.12	25.19	33.45
	Resolution	95.43	6.16	92.84	9.95	22.18	31.72	37.06	33.83
	Consequence	79.71	24.28	81.16	23.63	24.12	33.38	39.88	38.80
Normal Eating	Scene	30.14	25.43	21.58	24.44	3.71	5.50	6.88	17.97
	Approach	36.14	25.29	23.21	22.16	4.88	9.57	4.31	7.78
	Incident	56.86	28.14	28.53	26.01	7.59	15.92	7.56	16.39
	Resolution	68.86	27.55	26.32	27.99	7.00	13.43	6.75	17.55
	Consequence	51.57	24.11	25.05	24.68	3.24	5.19	8.81	15.75
Neutral	Scene	17.71	18.67	10.58	11.75	2.35	3.95	6.06	14.63
	Approach	16.14	16.28	13.32	12.34	1.47	2.07	8.63	19.36
	Incident	20.14	16.61	16.58	20.23	4.35	13.24	2.81	7.86
	Resolution	23.86	25.38	23.00	25.60	5.65	17.47	3.69	6.81
	Consequence	27.71	32.78	20.05	19.86	5.77	9.26	8.06	16.34

APPENDIX N

Dysfunctional Attitude Scale

ATTITUDE SCALE - Form A

This inventory lists different attitudes or beliefs which people sometimes hold. Read each statement carefully and decide how much you agree or disagree with it. For each statement, mark your answer using the number code given below that best describes how you think. To decide whether a given attitude is typical of your views, keep in mind how you think most of the time.

1	2	3	4	5	6	7
Disagree Totally	Disagree Very Much	Disagree Slightly	Neutral	Agree Slightly	Agree Very Much	Agree Totally

1. People will probably think less of me if I make a mistake.	
2. I must be a useful, productive, creative person or life has no purpose.	
3. I can find no greater enjoyment if I do things because I want to, rather than in order to please other people.	
4. By controlling the way I interpret situations, I can control my emotions.	
5. If you cannot do something well, there is little point in doing it at all.	
6. What other people think about me is very important.	
7. People should prepare for the worst or they will be disappointed.	
8. I should be able to please everybody.	
9. Even though a person may not be able to control what happens to her, she can control how she thinks.	
10. It is shameful for a person to display her weaknesses.	
11. If a person has to be alone for a long period of time, it follows that she has to be lonely.	
12. A person should try to be the best at everything she undertakes.	
13. If a person is not a success, then her life is meaningless.	
14. It is not necessary for a person to become frustrated if she finds obstacles to getting what she wants.	
15. If I make a foolish statement, it means I am a foolish person.	
16. I Should always have complete control over my feelings.	
17. I can enjoy myself even when others do not like me.	
18. If I do not set the highest standards for myself, I am likely to end up a second rate person.	

1	2	3	4	5	6	7
Disagree Totally	Disagree Very Much	Disagree Slightly	Neutral	Agree Slightly	Agree Very Much	Agree Totally

19. If I do not do well all the time, people will not respect me.	
20. One should look for a practical solution to problems rather than perfect solutions.	
21. My value as a person depends greatly on what others think of me.	
22. A person should do well at everything she undertakes.	
23. If someone disagrees with me, it probably means she does not like me.	
24. I cannot be happy unless most people I know admire me.	
25. My own opinions of myself are more important than others' opinions of me.	
26. If I do not treat people kindly, fairly, and considerately, I am a rotten person.	
27. It is awful to be disapproved of by people of by people important to you.	
28. If you do not have other people to lean on, you are bound to be sad.	
29. People will like me even if I am not successful.	
30. If other people know what you are really like, they will think less of you.	
31. Whenever I take a chance or risk I am only looking for trouble.	
32. If a person avoids problems, the problems go away.	
33. No one can hurt me with words. I hurt myself by the way I choose to react to people's words.	
34. Others can care for me even if they know all my weaknesses.	
35. If I fail partly, it is as bad as being a complete failure.	
36. People will reject you if they know all your weaknesses.	
37. I can reach important goals without slave-driving myself.	
38. My happiness depends more on other people than it does on me.	
39. If a person I love does not love me, it means I am unlovable.	
40. I ought to be able to solve my problems quickly and without a great deal of effort.	

APPENDIX O

Beliefs Inventory

Beliefs Inventory

It is not necessary to think over any items very long. Mark your answer quickly and go on to the next statement. Be sure to mark how you actually think about the statement, *not* how you think you *should* think.

Agree	Disagree	
☐	☐	1. It is important to me that others approve of me.
☐	☐	2. I hate to fail at anything.
☐	☐	3. People who do wrong deserve what they get.
☐	☐	4. I usually accept what happens philosophically.
☐	☐	5. If a person wants to, she can be happy under almost any circumstances.
☐	☐	6. I have a fear of some things that often bothers me.
☐	☐	7. I usually put off important decisions.
☐	☐	8. Everyone needs someone she can depend on for help and advice.
☐	☐	9. "A zebra cannot change his stripes."
☐	☐	10. I prefer quiet leisure above all things.
☐	☐	11. I like the respect of others, but I don't have to have it.
☐	☐	12. I avoid things I cannot do well.
☐	☐	13. Too many evil persons escape the punishment they deserve.
☐	☐	14. Frustrations don't upset me.
☐	☐	15. People are disturbed not by situations but by the view they take of them.
☐	☐	16. I feel little anxiety over unexpected dangers or future events.
☐	☐	17. I try to go ahead and get irksome tasks behind me when they come up.
☐	☐	18. I try to consult an authority on important decisions.
☐	☐	19. It is almost impossible to overcome the influences of the past.
☐	☐	20. I like to have a lot of irons on the fire.
☐	☐	21. I want everyone to like me.

Agree	Disagree	
☐	☐	22. I don't mind competing in activities in which others are better than I.
☐	☐	23. Those who do wrong deserve to be blamed.
☐	☐	24. Things should be different from the way they are.
☐	☐	25. I cause my own moods.
☐	☐	26. I often can't get my mind off some concern.
☐	☐	27. I avoid facing my problems.
☐	☐	28. People need a source of strength outside themselves.
☐	☐	29. Just because something once affects your life strongly doesn't mean it need do so in the future.
☐	☐	30. I'm most fulfilled when I have lots to do.
☐	☐	31. I can like myself even when many others don't.
☐	☐	32. I like to succeed at something, but I don't feel I have to.
☐	☐	33. Immorality should be strongly punished.
☐	☐	34. I often get disturbed over situations I don't like.
☐	☐	35. People who are miserable have usually made themselves that way.
☐	☐	36. If I can't keep something from happening, I don't worry about it.
☐	☐	37. I usually make decisions as promptly as I can.
☐	☐	38. There are certain people whom I greatly depend on.
☐	☐	39. People overvalue the influence of the past.
☐	☐	40. I most enjoy throwing myself into a creative project.
☐	☐	41. If others dislike me, that's their problem, not mine.
☐	☐	42. It is highly important to me to be successful in everything I do.
☐	☐	43. I seldom blame people for their wrongdoings.
☐	☐	44. I usually accept things the way they are, even if I don't like them.
☐	☐	45. A person won't stay angry or blue long unless she keeps herself that way.
☐	☐	46. I can't stand to take chances.

Agree	Disagree	
☐	☐	47. Life is too short to spend it doing unpleasant tasks.
☐	☐	48. I like to stand on my own two feet.
☐	☐	49. If I had different experiences I could be more like I want to be.
☐	☐	50. I'd like to retire and quit working entirely.
☐	☐	51. I find it hard to go against what others think.
☐	☐	52. I enjoy activities for their own sake, no matter how good I am at them.
☐	☐	53. The fear of punishment helps people be good.
☐	☐	54. If things annoy me, I just ignore them.
☐	☐	55. The more problems a person has, the less happy she will be.
☐	☐	56. I am seldom anxious about the future.
☐	☐	57. I seldom put things off.
☐	☐	58. I am the only one who can really understand and face my problems.
☐	☐	59. I seldom think of past experiences as affecting me now.
☐	☐	60. Too much leisure time is boring.
☐	☐	61. Although I like approval, it's not a real need for me.
☐	☐	62. It bothers me when others are better than I am at something.
☐	☐	63. Everyone is basically good.
☐	☐	64. I do what I can to get what I want and then don't worry about it.
☐	☐	65. Nothing is upsetting in itself – only in the way you interpret it.
☐	☐	66. I worry a lot about certain things in the future.
☐	☐	67. It is difficult for me to do unpleasant chores.
☐	☐	68. I dislike having others make decisions for me.
☐	☐	69. We are slaves to our personal histories.
☐	☐	70. I sometimes wish I could go to a tropical island and just lie on the beach forever.

Agree	Disagree	
☐	☐	71. I often worry about how much people approve of and accept me.
☐	☐	72. It upsets me to make mistakes.
☐	☐	73. It's unfair that "the rain falls on both the just and the unjust."
☐	☐	74. I am fairly easygoing about life.
☐	☐	75. More people should face up to the unpleasantness of life.
☐	☐	76. Sometimes I can't get fear off my mind.
☐	☐	77. A life of ease is seldom very rewarding.
☐	☐	78. I find it easy to seek advice.
☐	☐	79. Once something strongly affects your life, it always will.
☐	☐	80. I love to lie around.
☐	☐	81. I have considerable concern with what people are feeling about me.
☐	☐	82. I often become quite annoyed over little things.
☐	☐	83. I usually give someone who has wronged me a second chance.
☐	☐	84. People are happiest when they have challenges and problems to overcome.
☐	☐	85. There is never any reason to remain sorrowful for very long.
☐	☐	86. I hardly ever think of such things as death or atomic war.
☐	☐	87. I dislike responsibility.
☐	☐	88. I dislike having to depend on others.
☐	☐	89. People never change basically.
☐	☐	90. Most people work too hard and don't get enough rest.
☐	☐	91. It is annoying but not upsetting to be criticised.
☐	☐	92. I'm not afraid to do things which I cannot do well.
☐	☐	93. No one is evil, even though his deeds may be.
☐	☐	94. I seldom become upset over the mistakes of others.
☐	☐	95. Man makes his own hell within himself.

Agree	Disagree	
☐	☐	96. I often find myself planning what I would do in different dangerous situations.
☐	☐	97. If something is necessary, I do it even if it is unpleasant.
☐	☐	98. I've learned not to expect someone else to be very concerned about my welfare.
☐	☐	99. I don't look upon the past with any regrets.
☐	☐	100. I can't feel really content unless I'm relaxed and doing nothing.

APPENDIX P

VASs - Cognitions

Things are going well with my eating.

Strongly Agree _____ Strongly Disagree

I should not have eaten that.

Strongly Agree _____ Strongly Disagree

Food is my only comfort.

Strongly Agree _____ Strongly Disagree

I have already eaten too much, so I might as well eat more.

Strongly Agree _____ Strongly Disagree

I feel good about my appearance.

Strongly Agree _____ Strongly Disagree

I do not like the way I look.

Strongly Agree _____ Strongly Disagree

I'm fat, I must lose weight.

Strongly Agree _____ Strongly Disagree

I wish I could eat and not gain weight.

Strongly Agree _____ Strongly Disagree

I am pleased with the way things are going.

Strongly Agree _____ Strongly Disagree

I am disappointed in myself.

Strongly Agree _____ Strongly Disagree

I have no self control.

Strongly Agree _____ Strongly Disagree

I want everyone to like me.

Strongly Agree _____ Strongly Disagree

APPENDIX Q

ANOVA RESULTS FOR CHAPTER 11

Table 111.

Repeated measures ANOVA results for the BN, BED, OW, and NW groups for the VAS "Things are going well with my eating".

Source	Type III Sum of Squares	df	Mean Square	F	Sig.
SCRIPT	136863.63	2.00	68431.82	60.60	.000
SCRIPT by GROUP	57181.74	6.00	9530.29	8.44	.000
Error(SCRIPT)	126475.32	112.00	1129.24		
STAGE	11226.60	2.52	4457.94	17.21	.000
STAGE by GROUP	3914.49	7.56	518.13	2.00	.054
Error(STAGE)	36534.89	141.03	259.06		
SCRIPT by STAGE	8021.98	4.43	1811.33	6.22	.000
SCRIPT by STAGE by GROUP	5456.01	13.29	410.65	1.41	.153
Error(SCRIPT by STAGE)	72275.30	248.01	291.42		

Table 112.

Repeated measures ANOVA results for the BN, BED, OW, and NW groups for the VAS "I should not have eaten that".

Source	Type III Sum of Squares	df	Mean Square	F	Sig.
SCRIPT	191422.38	2.00	95711.19	83.02	.000
SCRIPT by GROUP	36098.46	6.00	6016.41	5.22	.000
Error(SCRIPT)	129129.70	112.00	1152.94		
STAGE	52576.37	2.52	20890.70	53.29	.000
STAGE by GROUP	7709.90	7.55	1021.15	2.61	.013
Error(STAGE)	55251.14	140.94	392.03		
SCRIPT by STAGE	51976.93	4.12	12614.32	23.64	.000
SCRIPT by STAGE by GROUP	13027.55	12.36	1053.89	1.98	.026
Error(SCRIPT by STAGE)	123147.19	230.75	533.69		

Table 113.

Repeated measures ANOVA results for the BN, BED, OW, and NW groups for the VAS "Food is my only comfort".

Source	Type III Sum of Squares	df	Mean Square	F	Sig.
SCRIPT	44600.82	1.88	23777.00	24.18	.000
SCRIPT by GROUP	28032.57	5.63	4981.45	5.07	.000
Error(SCRIPT)	103279.62	105.05	983.20		
STAGE	972.88	2.63	369.74	1.71	.173
STAGE by GROUP	2909.93	7.89	368.64	1.71	.102
Error(STAGE)	31816.54	147.35	215.93		
SCRIPT by STAGE	1115.53	4.95	225.39	1.18	.320
SCRIPT by STAGE by GROUP	2522.17	14.85	169.87	.89	.577
Error(SCRIPT by STAGE)	52981.23	277.17	191.15		

Table 114.

Repeated measures ANOVA results for the BN, BED, OW, and NW groups for the VAS "I have already eaten too much, so I may as well eat more".

Source	Type III Sum of Squares	df	Mean Square	F	Sig.
SCRIPT	77504.08	2.00	38752.04	46.18	.000
SCRIPT by GROUP	27376.82	6.00	4562.80	5.44	.000
Error(SCRIPT)	93993.63	112.00	839.23		
STAGE	21470.18	3.18	6758.71	18.65	.000
STAGE by GROUP	9830.33	9.53	1031.51	2.85	.003
Error(STAGE)	64468.76	177.89	362.40		
SCRIPT by STAGE	19613.81	4.48	4379.22	9.28	.000
SCRIPT by STAGE by GROUP	17132.25	13.44	1275.05	2.70	.001
Error(SCRIPT by STAGE)	118305.87	250.82	471.69		

Table 115.

Repeated measures ANOVA results for the BN, BED, OW, and NW groups for the VAS "I feel good about my appearance".

Source	Type III Sum of Squares	df	Mean Square	F	Sig.
SCRIPT	35114.60	2.00	17557.30	23.43	.000
SCRIPT by GROUP	19169.39	6.00	3194.90	4.26	.001
Error(SCRIPT)	83933.28	112.00	749.40		
STAGE	3528.52	3.81	926.50	7.61	.000
STAGE by GROUP	2287.40	11.43	200.20	1.64	.085
Error(STAGE)	25982.57	213.27	121.83		
SCRIPT by STAGE	2617.12	3.83	683.30	2.43	.052
SCRIPT by STAGE by GROUP	1854.08	11.49	161.36	.57	.856
Error(SCRIPT by STAGE)	60377.74	214.49	281.50		

Table 116.

Repeated measures ANOVA results for the BN, BED, OW, and NW groups for the VAS "I do not like the way I look".

Source	Type III Sum of Squares	df	Mean Square	F	Sig.
SCRIPT	30181.33	2.00	15090.66	22.82	.000
SCRIPT by GROUP	14681.78	6.00	2446.96	3.70	.002
Error(SCRIPT)	74055.55	112.00	661.21		
STAGE	3126.99	3.17	988.04	5.39	.001
STAGE by GROUP	2615.86	9.49	275.51	1.50	.146
Error(STAGE)	32510.50	177.23	183.44		
SCRIPT by STAGE	3432.38	5.69	603.70	3.15	.006
SCRIPT by STAGE by GROUP	3043.61	17.06	178.44	.93	.538
Error(SCRIPT by STAGE)	61062.92	318.39	191.79		

Table 117.

Repeated measures ANOVA results for the BN, BED, OW, and NW groups for the VAS "I'm fat, I must lose weight".

Source	Type III Sum of Squares	df	Mean Square	F	Sig.
SCRIPT	10287.51	2.00	5143.75	9.09	.000
SCRIPT by GROUP	7679.58	6.00	1279.93	2.26	.042
Error(SCRIPT)	63347.52	112.00	565.60		
STAGE	1610.58	2.17	742.56	2.70	.067
STAGE by GROUP	2327.63	6.51	357.72	1.30	.260
Error(STAGE)	33450.24	121.46	275.40		
SCRIPT by STAGE	2599.45	4.56	570.07	2.98	.015
SCRIPT by STAGE by GROUP	2764.49	13.68	202.09	1.06	.398
Error(SCRIPT by STAGE)	48845.47	255.36	191.28		

Table 118.

Repeated measures ANOVA results for the BN, BED, OW, and NW groups for the VAS "I wish I could eat and not gain weight".

Source	Type III Sum of Squares	df	Mean Square	F	Sig.
SCRIPT	10634.08	1.93	5515.58	5.82	.004
SCRIPT by GROUP	3510.17	5.78	606.87	.64	.692
Error(SCRIPT)	102262.07	107.97	947.15		
STAGE	266.43	3.11	85.71	.65	.591
STAGE by GROUP	1110.88	9.33	119.12	.90	.529
Error(STAGE)	23043.64	174.08	132.37		
SCRIPT by STAGE	1800.42	5.22	344.92	2.33	.040
SCRIPT by STAGE by GROUP	1201.95	15.66	76.76	.52	.935
Error(SCRIPT by STAGE)	43281.73	292.31	148.07		

Table 119.

Repeated measures ANOVA results for the BN, BED, OW, and NW groups for the VAS "I am pleased with the way things are going".

Source	Type III Sum of Squares	df	Mean Square	F	Sig.
SCRIPT	97047.30	1.96	49483.11	97047.30	1.805
SCRIPT by GROUP	52531.67	5.88	8928.40	11.73	.000
Error(SCRIPT)	83605.12	109.83	761.23		
STAGE	2464.28	3.35	735.41	3.71	.010
STAGE by GROUP	3628.41	10.05	360.94	1.82	.059
Error(STAGE)	37214.86	187.65	198.32		
SCRIPT by STAGE	4631.08	5.57	830.96	3.67	.002
SCRIPT by STAGE by GROUP	3533.70	16.72	211.35	.93	.534
Error(SCRIPT by STAGE)	70711.70	312.10	226.57		

Table 120.

Repeated measures ANOVA results for the BN, BED, OW, and NW groups for the VAS "I am disappointed in myself".

Source	Type III Sum of Squares	df	Mean Square	F	Sig.
SCRIPT	155706.46	1.86	83581.13	75.45	.000
SCRIPT by GROUP	65923.12	5.59	11795.55	10.65	.000
Error(SCRIPT)	115565.68	104.33	1107.75		
STAGE	7095.32	3.03	2345.39	12.13	.000
STAGE by GROUP	2438.86	9.08	268.72	1.39	.196
Error(STAGE)	32766.73	169.41	193.41		
SCRIPT by STAGE	14242.22	4.61	3089.00	9.11	.000
SCRIPT by STAGE by GROUP	9029.35	13.83	652.79	1.93	.025
Error(SCRIPT by STAGE)	87578.99	258.20	339.20		

Table 121.

Repeated measures ANOVA results for the BN, BED, OW, and NW groups for the VAS "I have no self control".

Source	Type III Sum of Squares	df	Mean Square	F	Sig.
SCRIPT	104541.63	1.74	60103.86	63.98	.000
SCRIPT by GROUP	54702.36	5.22	10483.30	11.16	.000
Error(SCRIPT)	91496.89	97.40	939.36		
STAGE	3529.60	2.55	1384.56	5.94	.001
STAGE by GROUP	1701.58	7.65	222.49	.95	.472
Error(STAGE)	33285.88	142.76	233.16		
SCRIPT by STAGE	6787.17	4.83	1405.70	5.44	.000
SCRIPT by STAGE by GROUP	6316.22	14.49	436.05	1.69	.055
Error(SCRIPT by STAGE)	69829.51	270.39	258.26		

Table 122.

Repeated measures ANOVA results for the BN, BED, OW, and NW groups for the VAS "I want everyone to like me".

Source	Type III Sum of Squares	df	Mean Square	F	Sig.
SCRIPT	3400.69	2.00	1700.35	6.18	.003
SCRIPT by GROUP	1622.69	6.00	270.45	.98	.440
Error(SCRIPT)	30806.22	112.00	275.06		
STAGE	81.87	3.36	24.34	.34	.820
STAGE by GROUP	495.56	10.09	49.12	.68	.741
Error(STAGE)	13552.67	188.34	71.96		
SCRIPT by STAGE	454.22	5.43	83.61	.83	.536
SCRIPT by STAGE by GROUP	910.31	16.30	55.85	.56	.917
Error(SCRIPT by STAGE)	30550.66	304.24	100.42		

Table 123.

ANOVA results for the BN, BED, OW and NW groups for the Beliefs Inventory Approval subscale.

	Sum of Squares	df	Mean Square	F	Sig.
Between Groups	83.44	3	27.81	2.86	.045
Within Groups	535.54	55	9.74		
Total	618.98	58			

Table 124.

ANOVA results for the BN, BED, OW and NW groups for the Beliefs Inventory Competence subscale.

	Sum of Squares	df	Mean Square	F	Sig.
Between Groups	43.09	3	14.36	2.11	.110
Within Groups	374.57	55	6.81		
Total	417.66	58			

Table 125.

ANOVA results for the BN, BED, OW and NW groups for the Beliefs Inventory Guilt subscale.

	Sum of Squares	df	Mean Square	F	Sig.
Between Groups	6.74	3	2.25	.56	.644
Within Groups	220.92	55	4.02		
Total	227.66	58			

Table 126.

ANOVA results for the BN, BED, OW and NW groups for the Beliefs Inventory Demand own way subscale.

	Sum of Squares	df	Mean Square	F	Sig.
Between Groups	65.94	3	22.00	4.33	.008
Within Groups	279.45	55	5.08		
Total	345.39	58			

Table 127.

ANOVA results for the BN, BED, OW and NW groups for the Beliefs Inventory Misery external subscale.

	Sum of Squares	df	Mean Square	F	Sig.
Between Groups	18.46	3	6.15	1.41	.250
Within Groups	240.08	55	4.37		
Total	258.54	58			

Table 128.

ANOVA results for the BN, BED, OW and NW groups for the Beliefs Inventory Fear of unknown subscale.

	Sum of Squares	df	Mean Square	F	Sig.
Between Groups	64.08	3	21.36	2.86	.045
Within Groups	410.90	55	7.47		
Total	474.98	58			

Table 129.

ANOVA results for the BN, BED, OW and NW groups for the Beliefs Inventory Avoidance subscale.

	Sum of Squares	df	Mean Square	F	Sig.
Between Groups	11.52	3	3.84	.89	.452
Within Groups	237.32	55	4.32		
Total	248.85	58			

Table 130.

ANOVA results for the BN, BED, OW and NW groups for the Beliefs Inventory Dependence subscale.

	Sum of Squares	df	Mean Square	F	Sig.
Between Groups	11.36	3	3.79	.97	.413
Within Groups	214.30	55	3.90		
Total	225.66	58			

Table 131.

ANOVA results for the BN, BED, OW and NW groups for the Beliefs Inventory Predetermination subscale.

	Sum of Squares	df	Mean Square	F	Sig.
Between Groups	44.44	3	14.82	3.44	.023
Within Groups	236.74	55	4.30		
Total	281.19	58			

Table 132.

ANOVA results for the BN, BED, OW and NW groups for the Beliefs Inventory Low effort subscale.

	Sum of Squares	df	Mean Square	F	Sig.
Between Groups	3.61	3	1.21	.32	.814
Within Groups	210.12	55	3.82		
Total	213.73	58			

Table 133.

ANOVA results for the BN, BED, OW and NW groups for the Dysfunctional Attitudes Scale.

	Sum of Squares	df	Mean Square	F	Sig.
Between Groups	7752.60	3	2584.20	2.45	.073
Within Groups	58032.62	55	1055.14		
Total	65785.22	58			

APPENDIX R

Mean Scores and Standard Deviations for the Cognitive VASs

Table 134.

Mean scores and standard deviations for the BN, BED, NW and OW groups across the five stages of the three different script, binge eating, normal eating and neutral, for the VAS "I want everyone to like me".

		BN		BED		NW		OW	
		M	SD	M	SD	M	SD	M	SD
Binge Eating	Scene	75.29	28.77	54.74	32.85	43.71	33.22	44.75	30.80
	Approach	76.14	27.47	58.68	32.32	43.65	29.91	42.50	29.41
	Incident	78.00	27.79	60.84	33.97	45.12	31.17	42.75	27.50
	Resolution	76.86	32.17	63.42	32.60	43.88	31.48	45.31	29.33
	Consequence	77.71	29.53	58.21	36.89	43.82	32.83	46.69	30.08
Normal Eating	Scene	69.71	24.68	52.11	28.33	44.45	32.15	41.06	29.52
	Approach	68.00	28.41	52.90	28.33	43.24	31.56	41.69	30.74
	Incident	72.71	29.50	49.00	32.06	40.47	30.56	39.31	30.41
	Resolution	70.71	28.63	51.58	32.74	41.29	30.99	43.19	29.81
	Consequence	71.86	30.69	53.21	33.97	42.71	31.85	43.5	33.73
Neutral	Scene	75.43	26.38	48.11	30.90	40.88	29.17	40.56	28.49
	Approach	73.43	28.57	52.47	32.51	41.65	30.90	43.81	31.82
	Incident	73.86	30.00	51.58	31.26	41.24	30.82	39.38	31.42
	Resolution	73.00	32.25	47.79	33.70	41.59	30.85	40.38	28.09
	Consequence	73.86	30.74	51.26	31.29	40.24	29.98	39.63	29.85

Table 135.

Mean scores and standard deviations for the BN, BED, NW and OW groups across the five stages of the three different script, binge eating, normal eating and neutral, for the VAS "I feel good about my appearance".

		BN		BED		NW		OW	
		M	SD	M	SD	M	SD	M	SD
Binge Eating	Scene	78.57	20.46	69.05	30.51	23.65	24.39	35.88	30.19
	Approach	79.29	22.01	73.37	26.54	24.65	22.23	39.13	29.52
	Incident	79.43	23.95	83.26	17.42	28.00	25.99	37.56	27.93
	Resolution	81.43	26.62	90.58	10.73	30.29	24.30	43.88	26.90
	Consequence	78.14	25.98	91.16	13.04	33.59	29.53	44.69	31.89
Normal Eating	Scene	54.29	28.73	51.11	24.62	19.82	21.66	31.44	17.76
	Approach	58.71	29.80	55.79	25.97	23.18	21.67	31.31	22.59
	Incident	63.14	28.35	57.47	29.03	24.00	20.03	32.31	21.49
	Resolution	62.14	27.09	61.32	29.52	24.35	21.04	32.38	22.69
	Consequence	57.57	29.02	62.00	28.86	23.12	20.31	33.50	24.58
Neutral	Scene	53.86	25.66	61.26	27.70	29.29	24.57	27.50	19.25
	Approach	51.57	27.26	65.68	26.90	28.47	26.50	28.38	19.29
	Incident	52.29	32.63	65.53	28.05	31.35	29.29	27.63	20.25
	Resolution	50.86	31.97	63.90	29.14	29.88	26.12	26.63	21.69
	Consequence	45.86	24.59	64.16	29.75	31.59	29.36	32.31	24.05

Table 136.

Mean scores and standard deviations for the BN, BED, NW and OW groups across the five stages of the three different script, binge eating, normal eating and neutral, for the VAS "food is my only comfort".

		BN		BED		NW		OW	
		M	SD	M	SD	M	SD	M	SD
Binge Eating	Scene	69.57	26.42	50.63	30.06	5.00	8.79	12.06	21.43
	Approach	62.57	35.28	61.16	30.71	6.88	17.41	11.81	19.91
	Incident	69.00	41.55	64.11	30.50	8.65	18.74	12.69	17.18
	Resolution	67.00	41.86	71.84	26.26	7.82	18.87	13.25	20.87
	Consequence	63.14	38.66	63.16	32.01	6.41	15.41	17.31	28.23
Normal Eating	Scene	40.57	26.03	34.26	24.21	3.24	4.42	7.31	14.24
	Approach	40.71	32.20	35.26	21.79	4.41	5.27	6.25	11.85
	Incident	43.86	31.17	37.90	26.80	6.06	9.34	8.00	14.36
	Resolution	45.86	26.04	26.37	31.48	4.88	9.44	5.94	11.02
	Consequence	39.86	25.26	32.63	29.94	2.65	4.21	6.69	14.78
Neutral	Scene	40.57	23.61	24.16	20.60	3.65	8.85	8.00	17.42
	Approach	31.14	26.75	33.05	24.48	2.18	5.08	8.75	18.54
	Incident	32.71	29.60	35.16	25.36	2.71	6.19	9.25	20.60
	Resolution	35.86	28.28	32.37	20.35	2.18	3.91	7.81	16.49
	Consequence	45.14	29.32	35.16	24.10	2.18	4.07	9.81	20.35

Table 137.

Mean scores and standard deviations for the BN, BED, NW and OW groups across the five stages of the three different script, binge eating, normal eating and neutral, for the VAS "I am pleased with the way things are going".

		BN		BED		NW		OW	
		M	SD	M	SD	M	SD	M	SD
Binge Eating	Scene	78.71	19.60	69.47	30.77	11.71	14.43	21.38	23.52
	Approach	84.29	9.50	75.58	18.30	12.47	15.33	21.06	26.02
	Incident	87.14	14.66	83.53	15.63	17.53	22.47	30.13	35.88
	Resolution	89.71	11.56	91.05	10.24	19.82	23.35	33.19	30.40
	Consequence	75.14	29.63	78.21	25.13	20.12	25.33	31.81	31.56
Normal Eating	Scene	43.29	20.99	40.63	25.46	11.18	14.55	20.06	23.74
	Approach	39.14	19.15	37.58	22.51	11.29	14.68	18.81	22.80
	Incident	40.43	19.89	41.95	28.60	12.65	16.67	17.63	17.45
	Resolution	43.86	17.63	44.53	27.91	15.77	22.32	15.50	19.90
	Consequence	40.43	11.39	44.53	30.97	11.24	15.09	20.31	23.48
Neutral	Scene	34.86	19.48	41.74	24.13	14.77	20.06	17.19	19.45
	Approach	42.86	28.32	41.05	28.19	12.41	15.88	17.06	21.63
	Incident	33.57	19.82	47.68	23.98	16.65	27.37	15.19	21.00
	Resolution	22.57	16.67	52.16	22.48	15.41	22.25	14.25	21.15
	Consequence	29.43	19.26	51.68	25.58	13.53	16.83	14.63	21.93

Table 138.

Mean scores and standard deviations for the BN, BED, NW and OW groups across the five stages of the three different script, binge eating, normal eating and neutral, for the VAS "I'm fat, I must lose weight".

		BN		BED		NW		OW	
		M	SD	M	SD	M	SD	M	SD
Binge Eating	Scene	85.29	12.18	71.95	31.01	15.94	18.91	58.50	29.63
	Approach	85.43	14.11	77.26	26.06	17.29	19.47	59.06	27.79
	Incident	84.71	17.00	88.53	9.70	19.88	20.88	56.44	27.66
	Resolution	87.29	15.21	95.11	7.44	27.06	24.12	60.50	29.86
	Consequence	85.00	17.54	92.16	10.96	26.00	27.17	56.06	32.20
Normal Eating	Scene	77.14	11.52	69.11	23.00	16.88	21.01	58.38	28.69
	Approach	73.29	15.82	67.05	26.52	18.71	20.74	57.69	29.57
	Incident	69.57	20.90	68.74	24.40	20.59	24.20	55.63	30.80
	Resolution	72.00	21.13	70.84	23.29	20.53	22.34	53.44	31.28
	Consequence	75.43	14.56	70.74	27.11	20.94	20.21	52.06	31.91
Neutral	Scene	73.43	17.44	69.16	28.49	24.82	23.97	53.44	28.11
	Approach	75.57	17.75	71.47	26.65	22.18	23.47	51.69	27.50
	Incident	78.86	16.44	72.42	28.11	22.88	23.13	55.19	27.88
	Resolution	79.57	21.09	68.78	29.04	24.65	23.48	51.44	26.37
	Consequence	76.00	18.89	74.16	25.81	23.53	24.52	50.69	27.88

Table 139.

Mean scores and standard deviations for the BN, BED, NW and OW groups across the five stages of the three different script, binge eating, normal eating and neutral, for the VAS "I do not like the way I look".

		BN		BED		NW		OW	
		M	SD	M	SD	M	SD	M	SD
Binge Eating	Scene	82.14	17.14	69.58	29.90	19.00	20.99	29.38	29.57
	Approach	82.57	14.56	71.53	28.74	18.77	20.96	31.81	26.90
	Incident	85.86	18.10	82.16	17.60	21.53	24.54	39.13	30.33
	Resolution	86.71	17.59	91.16	10.42	23.29	25.62	41.94	29.55
	Consequence	81.57	16.00	89.68	13.36	25.12	29.90	43.81	33.31
Normal Eating	Scene	53.71	27.45	57.05	27.94	15.53	18.69	30.19	20.43
	Approach	62.43	25.45	53.95	27.50	16.24	17.81	29.88	23.34
	Incident	64.71	23.61	59.84	31.47	15.53	18.93	27.25	21.49
	Resolution	68.57	24.81	59.84	30.86	15.00	18.88	27.00	22.00
	Consequence	60.29	29.28	64.47	28.96	16.94	19.66	26.81	22.83
Neutral	Scene	69.00	21.35	60.00	28.07	25.71	29.01	29.94	23.89
	Approach	67.86	21.25	61.11	31.48	24.41	27.44	30.38	23.47
	Incident	68.29	20.79	59.05	32.73	27.71	30.49	30.69	23.87
	Resolution	69.57	26.02	60.47	32.97	22.41	25.55	28.13	21.90
	Consequence	64.00	29.62	62.11	31.87	24.00	25.35	28.81	25.10

Table 140.

Mean scores and standard deviations for the BN, BED, NW and OW groups across the five stages of the three different script, binge eating, normal eating and neutral, for the VAS "things are going well with my eating".

		BN		BED		NW		OW	
		M	SD	M	SD	M	SD	M	SD
Binge Eating	Scene	79.57	17.92	61.63	34.20	8.77	17.44	13.81	22.00
	Approach	88.29	6.55	70.16	28.91	9.24	12.94	15.19	22.74
	Incident	93.86	6.20	86.53	16.97	12.53	13.55	24.06	29.70
	Resolution	97.29	2.81	91.95	9.74	17.00	24.11	38.81	26.83
	Consequence	90.00	15.24	93.84	8.05	18.65	30.38	33.63	36.77
Normal Eating	Scene	39.57	24.51	31.84	28.95	5.06	6.13	9.19	12.56
	Approach	30.43	20.86	28.16	21.07	8.35	11.32	9.50	10.05
	Incident	31.43	19.10	37.79	26.75	7.88	12.85	10.13	15.03
	Resolution	50.86	21.14	36.42	29.40	8.29	13.92	15.13	20.36
	Consequence	30.57	10.91	40.37	31.22	7.41	11.10	14.31	16.16
Neutral	Scene	40.29	32.28	41.68	31.60	2.18	4.56	11.25	20.16
	Approach	42.14	32.54	45.95	34.79	4.00	8.95	10.88	21.72
	Incident	47.57	34.55	46.11	29.96	5.29	9.82	9.88	21.59
	Resolution	45.57	37.13	47.26	30.88	3.82	7.03	10.81	23.20
	Consequence	49.00	39.67	45.68	30.54	3.29	5.79	10.13	22.53

Table 141.

Mean scores and standard deviations for the BN, BED, NW and OW groups across the five stages of the three different script, binge eating, normal eating and neutral, for the VAS "I wish I could eat and not gain weight".

		BN		BED		NW		OW	
		M	SD	M	SD	M	SD	M	SD
Binge Eating	Scene	87.57	7.53	86.90	21.85	44.00	34.06	65.06	33.92
	Approach	88.14	7.86	88.05	18.16	41.00	34.55	66.81	33.11
	Incident	90.71	9.41	87.90	17.75	51.35	34.31	67.88	33.38
	Resolution	91.29	10.10	91.16	15.09	52.12	33.95	73.75	28.87
	Consequence	88.86	13.32	84.79	28.19	49.77	37.58	67.31	34.53
Normal Eating	Scene	85.71	9.03	81.11	17.92	47.00	32.81	66.88	36.62
	Approach	82.14	13.34	78.32	18.84	42.41	33.15	62.19	36.06
	Incident	85.14	11.02	78.32	23.58	45.94	31.67	64.56	35.64
	Resolution	84.43	16.25	78.74	18.83	45.59	34.49	64.56	37.43
	Consequence	83.56	13.28	75.74	25.43	45.71	34.60	64.25	37.04
Neutral	Scene	79.57	15.67	72.32	29.89	43.88	37.47	60.31	34.93
	Approach	86.86	8.51	73.05	28.09	43.00	33.28	57.00	36.21
	Incident	80.71	15.62	69.79	30.19	44.35	36.17	57.63	35.11
	Resolution	74.14	23.43	70.74	31.33	45.82	35.58	58.94	34.13
	Consequence	86.14	14.35	74.32	26.31	42.47	33.83	58.37	33.75

Table 142.

Mean scores and standard deviations for the BN, BED, NW and OW groups across the five stages of the three different script, binge eating, normal eating and neutral, for the VAS "I have no self control".

		BN		BED		NW		OW	
		M	SD	M	SD	M	SD	M	SD
Binge Eating	Scene	70.00	30.91	66.74	31.10	9.47	14.67	15.69	20.32
	Approach	77.29	17.20	75.37	21.24	10.06	18.32	20.31	22.86
	Incident	82.43	22.04	87.26	13.70	12.82	22.24	27.75	29.04
	Resolution	85.86	23.40	92.42	8.13	13.41	22.02	36.13	34.10
	Consequence	75.00	30.87	84.68	20.55	15.47	30.00	34.69	34.96
Normal Eating	Scene	50.43	21.79	40.16	24.88	8.35	14.77	12.00	19.81
	Approach	33.14	16.28	33.95	25.02	8.29	16.07	12.63	19.65
	Incident	51.14	25.24	34.26	26.14	8.59	16.82	10.69	16.20
	Resolution	51.29	26.48	34.58	24.68	9.71	18.11	11.06	16.20
	Consequence	49.71	27.43	31.74	26.90	9.65	17.92	9.13	16.43
Neutral	Scene	35.71	22.54	44.84	25.77	9.18	18.45	7.94	11.19
	Approach	31.43	24.72	50.26	28.82	8.06	17.86	9.69	12.23
	Incident	32.29	18.56	47.32	29.11	9.06	18.09	8.13	12.61
	Resolution	39.57	29.34	40.32	28.08	9.00	20.24	9.19	15.52
	Consequence	42.43	29.08	42.68	28.43	8.18	17.72	8.75	12.27

Table 143.

Mean scores and standard deviations for the BN, BED, NW and OW groups across the five stages of the three different script, binge eating, normal eating and neutral, for the VAS "I am disappointed in myself".

		BN		BED		NW		OW	
		M	SD	M	SD	M	SD	M	SD
Binge Eating	Scene	80.71	16.75	61.16	34.62	9.06	15.86	11.94	21.26
	Approach	79.14	18.38	69.74	26.58	11.71	24.11	14.50	24.29
	Incident	85.86	20.76	85.26	16.87	15.24	26.33	24.81	35.35
	Resolution	89.00	18.05	95.84	6.25	18.00	28.36	36.63	41.54
	Consequence	85.86	17.09	90.37	15.95	22.29	34.04	42.50	41.50
Normal Eating	Scene	43.29	26.64	39.68	29.29	10.18	19.34	6.00	8.93
	Approach	58.57	14.19	30.79	25.75	7.18	13.24	7.00	13.77
	Incident	36.71	24.92	32.90	31.74	9.47	16.16	9.56	16.63
	Resolution	55.86	31.24	32.95	26.46	10.41	18.51	9.25	15.42
	Consequence	40.86	29.25	25.63	24.37	9.12	17.97	8.63	15.47
Neutral	Scene	34.14	21.84	38.16	31.52	12.41	20.42	9.88	17.76
	Approach	28.71	26.13	37.84	25.57	9.00	18.48	5.56	11.17
	Incident	29.00	30.78	35.42	36.35	11.53	23.65	6.88	16.58
	Resolution	23.29	28.45	37.74	27.63	9.00	22.70	6.75	12.91
	Consequence	26.57	27.87	41.11	28.62	8.94	18.57	5.38	12.06

Table 144.

Mean scores and standard deviations for the BN, BED, NW and OW groups across the five stages of the three different script, binge eating, normal eating and neutral, for the VAS "I have already eaten too much, so I may as well eat more".

		BN		BED		NW		OW	
		M	SD	M	SD	M	SD	M	SD
Binge Eating	Scene	25.00	22.79	42.53	38.66	3.12	11.60	10.56	19.64
	Approach	51.29	40.07	48.16	40.89	1094	5.76	14.75	22.78
	Incident	77.86	33.13	82.47	24.85	16.06	26.31	24.31	23.65
	Resolution	70.00	38.42	58.63	38.11	17.59	26.99	31.25	36.75
	Consequence	19.29	32.44	43.42	40.62	9.59	16.17	32.75	34.25
Normal Eating	Scene	15.57	17.68	16.00	18.72	1.24	2.88	9.06	16.66
	Approach	17.71	17.43	20.11	21.85	3.65	8.00	8.13	13.76
	Incident	51.29	37.86	23.95	22.97	5.59	10.04	5.75	9.70
	Resolution	44.57	39.51	24.53	27.07	4.53	9.38	6.44	13.45
	Consequence	35.43	31.66	21.84	22.72	1.88	5.00	5.38	9.75
Neutral	Scene	9.86	9.17	21.21	25.80	0.88	2.96	4.31	12.88
	Approach	17.29	18.07	29.00	27.66	0.82	2.92	4.25	12.43
	Incident	8.43	4.83	29.95	30.22	0.94	2.77	4.13	11.95
	Resolution	6.29	4.79	26.90	26.99	0.88	2.64	4.25	12.28
	Consequence	13.14	19.37	28.21	24.23	1.00	3.00	4.06	12.22

Table 145.

Mean scores and standard deviations for the BN, BED, NW and OW groups across the five stages of the three different script, binge eating, normal eating and neutral, for the VAS "I should not have eaten that".

		BN		BED		NW		OW	
		M	SD	M	SD	M	SD	M	SD
Binge Eating	Scene	35.57	36.94	43.32	36.84	5.06	13.79	15.50	24.12
	Approach	56.29	35.13	44.79	36.25	4.06	12.46	16.56	26.12
	Incident	92.00	7.72	83.63	24.79	22.35	27.88	33.44	36.32
	Resolution	95.86	5.21	96.58	5.27	34.24	35.77	51.81	35.24
	Consequence	94.14	8.30	93.79	11.77	31.82	38.55	57.56	35.22
Normal Eating	Scene	13.86	13.47	22.74	27.35	0.77	2.02	10.31	17.23
	Approach	17.43	12.31	24.26	22.91	2.53	4.63	7.88	15.90
	Incident	50.71	26.79	21.74	20.50	8.77	18.31	5.56	15.69
	Resolution	56.29	33.49	24.42	28.59	12.29	17.78	7.69	12.72
	Consequence	45.29	28.12	19.84	25.10	8.88	18.93	10.25	19.23
Neutral	Scene	27.00	30.82	22.16	25.12	1.12	2.52	4.31	12.76
	Approach	34.14	34.93	31.26	29.46	0.82	2.16	4.19	12.10
	Incident	29.57	39.32	33.95	30.04	1.94	4.75	4.13	11.85
	Resolution	26.14	35.51	31.00	29.08	1.29	2.80	4.63	12.12
	Consequence	25.00	34.90	31.16	28.10	1.24	3.53	4.13	12.21